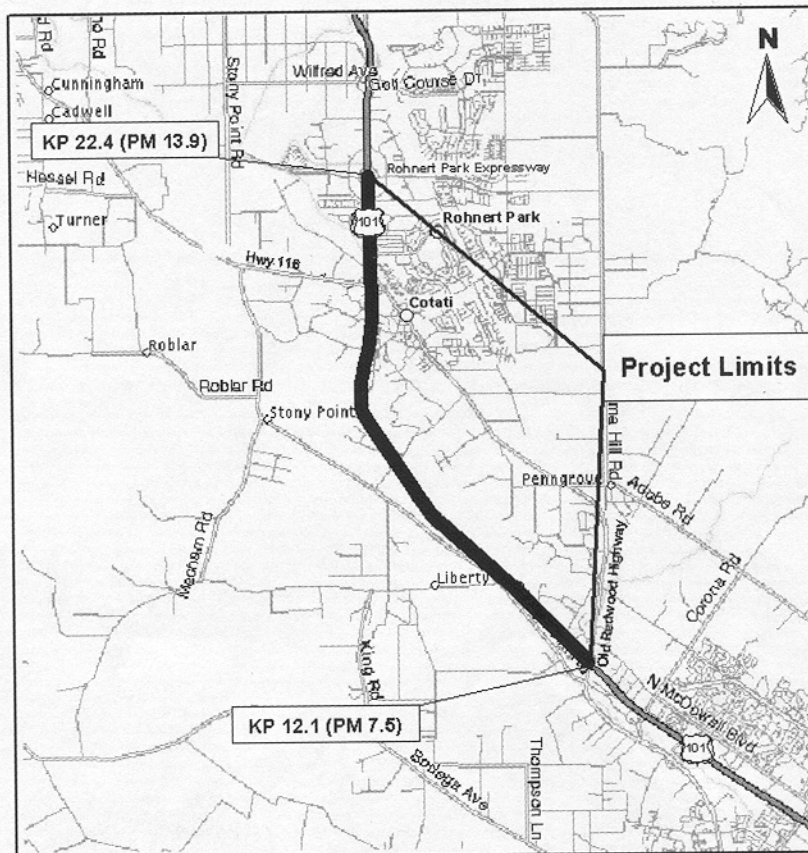


PROJECT STUDY REPORT (Project Development Support)

This document will be used to program the Engineering and Environmental Support for the Project Approval and Environmental Document (PAVED) and Plans, Specifications, and Estimate (PS&E) phases of the project. The capital components for Right of Way and Construction are preliminary estimates and are not suitable for programming purposes. A Project Report will serve as the programming document for the remaining support and capital components of the project.



On Route 101
in Sonoma County Between Old Redwood Highway
and Rohnert Park Expressway (KP 12.1/22.4)

SUBMITTED BY: Sandy Wong
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APPROVAL RECOMMENDED BY: Nino Cerruti
NINO CERRUTI, PROJECT MANAGER

APPROVED: H.P. (Paul) Hensley
H.P. (PAUL) HENSLEY, CHIEF DEPUTY DISTRICT DIRECTOR

12/21/01
DATE

This Project Study Report (Project Development Support) has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.


JOHN D. KOMARU, REGISTERED CIVIL ENGINEER

12/17/01
DATE

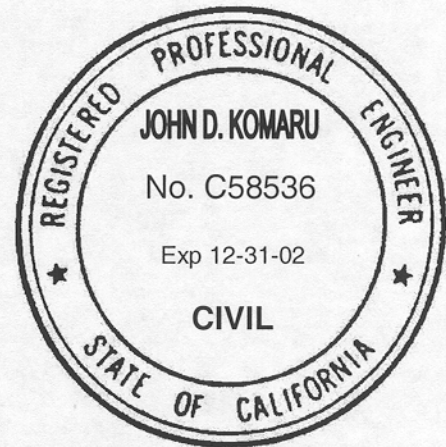


TABLE OF CONTENTS

1.	INTRODUCTION.....	1
2.	BACKGROUND	1
	Existing Facility	2
	Project History	2
	Sponsorship Commitment.....	2
3.	NEED AND PURPOSE	4
	Project Need	4
	Purpose.....	6
4.	ALTERNATIVES	10
	No-Build Alternative.....	10
	Minimum Project Alternative	11
	Expanded Project Alternative	14
5.	SYSTEM AND REGIONAL PLANNING	15
6.	ENVIRONMENTAL DETERMINATION	17
	Natural Environment.....	18
	Biological Resources.....	19
	Cultural Resources	20
	Noise	20
	Air Quality	21
	Visual Resources.....	21
	Water Quality	22
	Hazardous Waste.....	23
	Section 4(f).....	26
	Farmlands	26
	Land Use	27
	Plans and Policies.....	27
7.	RIGHT OF WAY	28
8.	FUNDING/SCHEDULING	28
9.	PROGRAMMING RECOMMENDATION.....	29
10.	DEPARTMENTAL CONTACTS	30
11.	CONTACTS OUTSIDE THE DEPARTMENT	30
12.	ATTACHMENTS	30

PROJECT STUDY REPORT (PROJECT DEVELOPMENT SUPPORT)

1. INTRODUCTION

This Project Study Report (Project Development Support) (PSR[PDS]) document proposes to establish and organize sufficient information to support the development of proposed improvements to the Route 101 segment in Sonoma County between Old Redwood Highway (KP 12.1) and Rohnert Park Expressway (KP 22.4). Attachments A1 and A2 illustrate the general project location and limits. The Minimum Project Alternative proposes High Occupancy Vehicle (HOV) lanes in both directions from KP 12.1 to KP 22.4 along Route 101, a northbound climbing lane along the Cotati Grade beginning just north of Old Redwood Highway from approximately KP 13.4 to KP 18.0, re-alignment of nonstandard on-ramps, and ramp metering facilities and HOV preferential (by-pass) lanes on the existing on-ramps within the project limits. The Expanded Project Alternative would include the work listed within the Minimum Project Alternative, plus northbound and southbound auxiliary lanes between Route 116 West (KP 20.8) and Rohnert Park Expressway (KP 22.4), and three new ramps to complete a full diamond interchange at Railroad Avenue (KP 17.2). Refer to Attachment B for proposed cross-sections and Attachment C for proposed layout plans for each build alternative.

It is recommended that a total of \$10 million be programmed in the 2002 State Transportation Improvement Plan (STIP) to cover the support costs for the Project Approval/Environmental Document (PA/ED) and the Project Plans, Specifications, and Estimate (PS&E) phases of this project. The schedule of the proposed project anticipates the beginning of the PA/ED phase in 2002, followed by project approval in fiscal year 2006/2007, and completion of construction in 2010. The main funding source for this project is the STIP. The Sonoma County Transportation Authority (SCTA) anticipates supplementing regular STIP funding with Grant Anticipation Revenue Vehicle (GARVEE) Bonds. The escalated capital costs for the Minimum Project Alternative, including environmental mitigation, right of way acquisition, and construction, are estimated to range from \$90-\$115 million (\$80-\$90 million current cost). The escalated capital costs for the Expanded Project Alternative are estimated to range from \$120-\$135 million (\$95-\$105 million current cost). These costs are shown in Attachment D. The various capital cost components have been escalated at an annual rate of 3.5%, seven years forward, from 2001 to 2008. **The capital costs presented in this document are to be used solely for planning purposes and not for programming funds.**

2. BACKGROUND

Route 101 is the primary transportation corridor serving employment and residential areas of the North Bay Area. It is also an essential regional transportation link providing primary access to California's north coastal areas and to the Oregon border. Other major routes in the vicinity of the proposed project are Routes 12, 116 and 121. However, Route 101 is the

only north and south thoroughfare for Sonoma County and serves high volumes of weekday, weekend, and off-peak traffic (recreational and commercial).

2.1 Existing Facility

Route 101 currently has a typical cross-section of four lanes with an unpaved median and nonstandard shoulders. Each direction maintains two mixed-flow travel lanes that are 3.6 meters (m) wide. Within the project limits, Route 101 maintains a median width ranging from 10.8 m to 12.2 m with outside shoulders ranging from 2.4 m to near 3.0 m. The current median is unpaved with a double thrie beam barrier (DTBB) separating opposing directions of traffic. Between KP 12.1 and KP 22.4, there are non-standard, inside shoulder widths of 1.2 m. Throughout the corridor, the shoulder widths vary and are, on average, nonstandard.

A truck brake check area is provided in the southbound direction at the Cotati Grade Summit at approximately KP 17.9. There are no existing auxiliary lanes or ramp metering facilities within the project limits.

Two existing nonstandard on-ramps are located at the Route 116 West connection to northbound Route 101 and the westbound Old Redwood Highway connection to northbound Route 101.

2.2 Project History

Recent demographic trends and escalating regional growth have increased travel demand within the Route 101 corridor. To address the traffic congestion conditions along the Route 101 corridor in Marin and Sonoma Counties, several projects have proposed facility improvements such as HOV lanes in each direction, auxiliary lanes between interchanges, standard highway features, and ramp metering at all on-ramps throughout the corridor. The proposed HOV-lane corridor includes Route 101 from south of the City of Mill Valley in Marin County to the City of Windsor in Sonoma County.

One of the corridor's most critical capacity constraints occurs at the segment known as the Novato or Marin-Sonoma Narrows, located from KP 29.4 to KP 37.0 in Marin County and from KP 0.0 to KP 12.4 (Old Redwood Highway) in Sonoma County. This section will be improved from a four-lane expressway to a six-lane freeway with northbound and southbound HOV lanes as part of the Marin-Sonoma Narrows Project, slated for completion by fiscal year 2010/2011.

2.3 Sponsorship Commitment

The Sonoma County Transportation Authority (SCTA) is fully supportive of the proposed project. In conjunction with the State of California Department of Transportation (Department) and the Metropolitan Transportation Commission (MTC), the SCTA is

administering the Project Initiation Document (PID) phase to obtain project funding for the proposed project. Other on-going Route 101 improvement projects, under the joint-coordination of the Department and the SCTA, are shown in Table 1.

TABLE 1
HOV/HIGHWAY WIDENING PROJECTS ALONG ROUTE 101 IN SONOMA COUNTY*

	Expenditure Authori- zation (EA)	Status of PID	Environmental and/or design work underway?	Under Construc- -tion	PA/ED Completion	Begin Construc- tion (FY)	End Construc- tion (FY)
Route 37 to Atherton Avenue	28200K	Approved	Yes	No	June 2005	2005/2006	2007/2008
Atherton Avenue to Route 116 East	264000	Approved	Yes	No	June 2005	2008/2009	2010/2011
Route 116 East to Old Redwood Highway	28112K	Approved	Yes	No	June 2005	2005/2006	2007/2008
Old Redwood Highway to Rohnert Park Expressway	0A180K	In- progress	No	No	2006/ 2007 FY	2008/2009	2010/2011
Rohnert Park Expressway to Santa Rosa Avenue	129560	Approved	Yes	No	2003/ 2004 FY	2005/2006	2007/2008
Wilford Avenue to Route 12	2724U4	Approved	Yes	Yes	---	Under Construc- tion	Fall 2002
Route 12 to Steele Lane	245400	Approved	Yes	No	2002/ 2003 FY	2005/2006	2007/2008
Steele Lane Interchange	263900	Approved	Yes	No	2002/ 2003 FY	2005/2006	2007/2008
Steele Lane to the Windsor River Road Undercrossing	0A100K	In- progress	No	No	2006/ 2007 FY	2008/2009	2010/2011

FY = Fiscal Year

PA/ED = Project Approval and Environmental Document

*The estimated milestone dates shown in this table are for planning purposes only.

3. NEED AND PURPOSE

3.1 Project Need

The proposed project will address the primary needs of alleviating traffic congestion, providing a continuous HOV lane system, and correcting existing nonstandard ramps. Depending on the availability of funds, the project may also address certain secondary needs, such as correcting operational problems at the Cotati grade, improving weaving sections, and completing the interchange at Railroad Avenue.

3.1.1 Primary Needs

3.1.1.1 To Alleviate Recurring Traffic Congestion

Traffic bottlenecks occur on several highway segments within the Route 101 corridor in Marin and Sonoma Counties. One of the most critical segments is located in Sonoma County, between Old Redwood Highway (in Petaluma) and Rohnert Park Expressway (in Rohnert Park). In general, on a typical weekday, the morning peak direction on Route 101 is southbound towards Marin and the San Francisco Peninsula, and the evening peak direction is northbound (reverse direction). However, due to the effects of regional growth and increases in the number of employment centers in central Sonoma County, congestion also occurs in the northbound direction during the morning peak period. Weekday traffic congestion is attributable to the high volume of commuter and commercial trips and Route 101's capacity constraints within the corridor.

The average two-way peak hour traffic volume along the project segment of Route 101 is 6,550 vehicles during the weekday (Caltrans: Traffic and Vehicle Data Systems Unit, Year 2000 Traffic Volumes). The peak hour traffic volumes of 6,800 vehicles, both in the vicinity of Pepper Road (just northwest of Old Redwood Highway) and at Rohnert Park Expressway along Route 101, are higher than the average two-way peak hour traffic volumes. The PSR(PDS) for the HOV lane project just south of the proposed project limits, EA 28112K, August 2001, identified traffic problems on northbound Route 101, including those caused by slow truck movements at the Route 101/Old Redwood Highway interchange in Petaluma. For Route 101 southbound traffic, a bottleneck was identified at the beginning of the Marin-Sonoma Narrows Expressway near the Petaluma Boulevard (South) interchange in Petaluma. From this point, traffic was reportedly backed up nearly to the Old Redwood Highway interchange. When the Marin-Sonoma Narrows project is completed, it is anticipated that the traffic bottleneck will shift north along Route 101 to the Old Redwood Highway interchange. Thus, there will be a need to improve the segment of Route 101 from Old Redwood Highway to Rohnert Park Expressway as part of a system-wide plan to alleviate bottleneck conditions.

3.1.1.2 To Provide a Continuous HOV Lane System

The proposed highway widening is part of an overall effort to fill a major gap and create continuity in the North Bay HOV lane system in order to provide timesavings as an incentive to HOV travelers. By increasing the efficiency of the transportation system, HOV usage plays an important role in alleviating traffic congestion. Other HOV lane projects that are planned and/or funded along the Route 101 Corridor in Sonoma County are shown in Table 1 (page 3). All projects listed in Table 1 are included in the Draft 2001 Regional Transportation Plan (RTP) prepared by the MTC, published on August 10, 2001, and proposed for adoption in December 2001.

When completed, the projects listed in Table 1 will provide a continuous HOV lane facility within Sonoma County, extending over a length of 29.5 kilometers, from the Marin-Sonoma County line to the City of Windsor in northern Sonoma County.

3.1.1.3 To Correct Existing Nonstandard Ramps at Interchanges

The interchange of Route 101 and Route 116 West is a standard diamond interchange in all quadrants except the northeast quadrant. The current alignment of the on-ramp from Route 116 West to northbound Route 101 transitions from Cotati's main thoroughfare (Old Redwood Highway) and does not complete the diamond interchange. The current alignment causes driver confusion and the potential for vehicle conflicts at the intersection of Commerce Avenue and Old Redwood Highway. Thus, there is a need to realign the northbound on-ramp to meet current design standards for an on-ramp forming part of a diamond interchange.

The on-ramps from eastbound and westbound Old Redwood Highway to northbound and southbound Route 101 are diagonal ramps with a significant skew. The current alignment of each on-ramp limits the acceleration (approach speed) when merging onto Route 101 and decreases the driver comfort level, especially for those driving heavy and large vehicles. There is a need to increase the radii of the existing ramp skews to allow for increased driver comfort and approach speeds when merging with Route 101 from these diagonal ramps.

3.1.2 Secondary Needs

3.1.2.1 To Address Operational Problems at the Cotati Grade

Besides the high vehicle demand on Route 101, another significant factor that contributes to the congestion problem is the Cotati Grade from KP 13.4 to 18.0 (PM 8.0 to 11.2). Heavy vehicles traveling northbound cannot generate enough speed to adequately climb the grade, thereby reducing vehicle speeds and inhibiting the flow of northbound traffic. The nonstandard on-ramp from westbound Old Redwood Highway to northbound Route 101 also inhibits heavy vehicles' acceleration onto the freeway mainline.

3.1.2.2 To Address Weaving Problems

Peak period freeway mainline operations between the Rohnert Park Expressway and Route 116 West interchanges were observed to be restricted with unstable flow in the weaving areas. Field surveys found that highway operations within this segment are hindered by the weaving activities between these two interchanges. Currently, weaving activities affect both northbound and southbound Route 101 mainline operations, at various times resulting in additional delay and increasing the potential for incidents. Each interchange serves as the main Route 101 access point for the Cities of Rohnert Park and Cotati, resulting in considerable peak period demand. This Route 101 segment is used as a primary thoroughfare between the two cities due to the lack of parallel northbound and southbound highways. Detailed mainline operational studies during the PA/ED phase will quantify the need for auxiliary lanes along this segment.

3.1.2.3 To Complete an Interchange (Provide Full Access) at Railroad Avenue

The existing Route 101 access at Railroad Avenue consists of only a northbound off-ramp. Northbound traffic merging with Route 101 near Railroad Avenue must travel on local streets (Old Redwood Highway) for approximately 4.3 kilometers north to the Route 116 West interchange in the City of Cotati or travel 7.2 kilometers south to the Old Redwood Highway interchange in the City of Petaluma. To access Railroad Avenue from southbound Route 101, traffic must use the Route 116 West interchange to the north, or the Old Redwood Highway interchange to the south, and use local streets (Stony Point Road) for an additional 7.8 kilometers (from the north) or 5.5 kilometers (from the south). Traffic on Railroad Avenue accessing southbound Route 101 must either travel north roughly 6.4 kilometers to the Sierra Avenue interchange or travel south roughly 3.3 kilometers to the Pepper Road southbound Route 101 on-ramp from Stony Point Road. The Cities of Rohnert Park and Cotati and the community of Penngrove receive the majority of this Route 101 through traffic.

3.2 Purpose

The proposed HOV lane project, along with the climbing lane, will increase system capacity on the section of Route 101 between Old Redwood Highway and Rohnert Park Expressway, mitigating, in part, the increasing traffic congestion along Route 101. The proposed HOV lanes will contribute to the goal of a continuous HOV lane system between southern Marin County and north-central Sonoma County, which will enable high-occupancy vehicles to bypass traffic congestion in most areas along this corridor. Without the proposed project, there will be a gap in the corridor's HOV lane system. The additional components of the Expanded Project Alternative (the auxiliary lanes and the full diamond interchange) will improve the operation of the freeway and local streets as an entire system and will provide new access to the freeway from the local streets.

The HOV lane on Route 101 is expected to provide significant timesavings to HOV commuters during weekday peak hours and improve traffic flow on mixed-flow lanes. Along the project improvement corridor, HOV lane travelers are anticipated to save an average of six minutes in the southbound direction and at least ten minutes in the northbound direction during peak periods. If the project were not constructed, the proposed project limits would become a corridor bottleneck creating a significant impact to the northern and southern sections of Route 101, especially if the projects north and south of this segment are constructed. In this case, the benefits from all the other corridor improvement projects would be diminished, as the congestion would simply be shifted to a new location.

3.2.1 Traffic Operations Summary

A summary of existing and expected traffic operations under the no-build and Minimum Build alternatives is presented here. This summary is based on the preliminary traffic assessment and narrative provided in Attachment G. Existing traffic congestion on Route 101 in Sonoma County will substantially worsen in the future, if traffic growth occurs as projected. Traffic projections show that peak hour traffic is anticipated to increase by about 40 to 50 percent by 2030, between the Old Redwood Highway/Route 101 interchange in Petaluma and the Rohnert Park Expressway/Route 101 interchange in Rohnert Park. Inasmuch as various parts of Route 101 are already operating at capacity, this additional traffic will be caught in growing traffic queues.

The proposed HOV lane projects, plus other projects under way will result in the establishment of a continuous HOV lane in each direction. They will increase system capacity on Route 101 in Sonoma County, reducing part of the traffic congestion that is expected to develop in the future, and will provide a way for high occupancy vehicles to bypass the rest of the traffic congestion.

During the next phase of the project (PA/ED), detailed analyses of traffic operations, including HOV concerns, will be conducted. These analyses will provide better information on the optimum usage and configuration of the HOV facilities and ramp metering implementation. A plan for implementation of these facilities will be developed at a later date. In addition, the adequacy of the existing park-and-ride facilities and the feasibility for additional park-and-ride facilities will be assessed during the PA/ED phase of the project.

Although the forecasting methodology and assumptions addressed in Attachment G are accepted for this phase of project development, in the PA/ED phase it will be necessary to generate more detailed corridor and project specific travel demand forecasts from a validated countywide model or combination of forecasting tools as approved by all reviewing agencies (i.e. the Marin-Sonoma Countywide Model, MTC projections, etc.). The project specific travel demand forecasts should include the latest and approved land use projections within the corridor including the recently adopted City of Rohnert Park General Plan update.

3.2.2 Accident Data

Accident data for the three-year period between April 1, 1998 and March 31, 2001 for the Route 101 project section – KP 12.1/22.4 (PM 7.5/13.9) are summarized in Table 2. Caltrans' Traffic Accident Surveillance and Analysis System (TASAS) provided the actual (recorded within project limits) and average (recorded for similar transportation facilities statewide) accident rates. TASAS values are expressed in terms of accidents per million vehicle miles (MVM).

TABLE 2
TASAS ACCIDENT DATA

Direction	Actual Accident Rates (MVM)			Average Statewide Accident Rates (MVM)			Number of Accidents		
	Fatal	Fatal + Injury	Total*	Fatal	Fatal + Injury	Total*	Fatal	Fatal + Injury	Total*
Northbound	0.009	0.39	0.90	0.021	0.40	0.99	3	127	291
Southbound	0.003	0.38	0.80	0.021	0.40	0.99	1	121	257

Source: Office of Traffic, Caltrans, October 2001

Note: Accident data for period April 1, 1998 to March 31, 2001 for Route 101-KP 12.1/22.4 (PM 7.5/13.9)

MVM=per million vehicle miles

TASAS= Traffic Accident Surveillance and Analysis System

* Total includes fatal, injury, and non-injury accidents

Actual accident rates for Route 101 northbound and southbound are compared with average statewide accident rates. The total accident rate is comprised of fatal, injury, and non-injury accidents. Results indicate that the fatal and total actual accident rates fall below the average statewide accident rates for both travel directions. The fatal plus injury actual accident rates for both directions are slightly less than the average statewide accident rates.

The total number of accidents along this project section is 548 accidents with a breakdown of 291 and 257 accidents for northbound and southbound, respectively. Table 3 summarizes the accident type for both directions combined. Types of accidents include rear end, hit object, sideswipe, overturn, broadside, and head-on.

TABLE 3
ACCIDENT TYPE

Type of Collision	Number	Percentage (%)
Rear End	300	54.7
Hit Object	159	29.0
Sideswipe	46	8.3
Overtake	14	2.5
Broadside	9	1.6
Head-on	2	0.3
Other	18	3.2
TOTAL	548	100

Source: Office of Traffic, Caltrans, October 2001

Note: Accident data for period April 1, 1998 to March 31, 2001 for Route 101-KP 12.1/22.4 (PM 7.5/13.9)

Table 4 shows the primary contributory causes of the vehicle collisions.

TABLE 4
ACCIDENT COLLISION FACTORS

Collision Factors	Percentage (%)
Following too close	32.8
Speeding	29.1
Improper turn	12.5
Influence of alcohol	7.2
Other than driver's fault	2.7
Asleep while driving	2.1
Improper driving	0.3
Other violation	11.6
Unknown	1.0

Source: Office of Traffic, Caltrans, October 2001

Note: Accident data for period April 1, 1998 to March 31, 2001 for Route 101-KP 12.1/22.8 (PM 7.5/14.2)

Both “following too close” and “speeding” account for over 60 percent of the collisions. Improper turning and other violations contribute approximately 12 percent of accident causing factors. The accident data information also shows that the majority of accidents take place during the daytime with a percentage of 78.2 percent. Under clear and dry driving conditions, the percentages are 70.0 percent and 83.7 percent, respectively.

The major type of collision shown in Table 4 is rear end, which is attributed to the major collision factor of following too close. By addressing traffic congestion, the proposed project may reduce the frequency of rear-end collisions, often associated with congested driving conditions. The proposed project will also address operational problems at the Cotati Grade (KP 13.4 to 18.0) where overall vehicle speeds are reduced as a result of heavy vehicles that cannot generate enough speed to adequately climb the grade.

In addition to the Cotati Grade, peak period freeway mainline operations between the Rohnert Park Expressway and Route 116 West interchanges were observed to be restricted with unstable flow in the weaving areas. There is a potential for incidents caused by the weaving activities between these two interchanges.

3.2.3 Public Support

The widening of Route 101 for HOV lanes within the project limits is generally accepted by the local municipalities and agencies. The proposed project was presented at the meeting of the SCTA Board of Directors in the Office of Community Development in Santa Rosa on October 8, 2001. The SCTA Board positively accepted the proposed project and authorized it to proceed.

4. ALTERNATIVES

The project limits are on Route 101 from just south of the Old Redwood Highway interchange (KP 12.1) to 50 meters north of the Rohnert Park Expressway interchange (KP 22.4), for a total project length of approximately 10.3 kilometers. Two “build” alternatives and a “no-build” alternative were evaluated for this PSR(PDS). The two “build” alternatives are the Minimum Project Alternative and the Expanded Project Alternative. Details of each alternative are described in the sections that follow. The build alternatives are further illustrated by the cross-sections and plan layout sheets provided in Attachments B and C.

General Considerations. There is no existing railroad within the project limits. Environmental issues applicable to both alternatives are discussed in Section 6. A Transportation Management Plan (TMP), which is a plan to alleviate traffic impacts during construction, will be needed for this project. Based on the TMP guidelines for preparation of the PSR(PDS), detailed capital cost estimates for implementation of the TMP will be deferred until the PS&E phase. Funds for Traffic Operations Systems (TOS) elements to aid in management of traffic congestion have also been included for both alternatives.

4.1 No-Build Alternative

The No-Build Alternative is a base scenario for comparison with the build alternatives. The no-build scenario proposes no new improvements other than routine maintenance and rehabilitation, along with minor improvements such as replacement of the existing three-beam barrier in the median. This alternative does not fulfill the Need and Purpose of the proposed project.

4.2 Minimum Project Alternative

- The Minimum Project Alternative includes the following elements within the project limits:
- Widening for two new 3.6-meter-wide HOV lanes, one northbound and one southbound, along with widening of inside and outside shoulder widths to meet the current design standard of 3.0 meters;
- Widening of two undercrossing pairs, one bridge pair, a separation, various culverts, and a cattle undercrossing to accommodate mainline widening;
- Realignment of two on-ramps to meet current design standards;
- Ramp metering facilities at all nine existing on-ramps within the project limits;
- Widening of seven on-ramps for HOV preferential lanes (the northbound and southbound loop on-ramps at Old Redwood Highway in Petaluma will not be widened); and
- A 3.6-meter wide northbound climbing lane along the 4.6-kilometer Cotati Grade.

4.2.1 Widening for HOV Lanes and Standard Shoulders

The new HOV lanes will be standard widths of 3.6 meters. The existing mixed-flow lanes will retain widths of 3.6 meters, and the inside and outside shoulders will be widened to the current design standard of 3.0 meters. Widening for the new HOV lanes and standard shoulder widths will require paving of the existing median. In addition, throughout most of the project limits, the new outer edges of pavement will extend about 1.2 m to 2 m beyond existing edges of shoulders on both sides of Route 101.

A review of the Department's maintenance and bridge inspection records indicated that the existing vertical clearance at the Denman Overcrossing (at Old Redwood Highway in Petaluma, KP 12.3) is just below 4.6 meters. Because the Denman Overcrossing passes over Route 101, which is a freeway, the required standard vertical clearance is 5.1 meters. At this location, the existing vertical clearance is nonstandard; the proposed project would lower Route 101 approximately 175 mm and increase the vertical clearance under the structure to 4.6 meters. As the clearance under the Denman Overcrossing will remain nonstandard, conceptual concurrence for this design exception has been obtained (see Attachment F, Design Scoping Checklist). A formal fact sheet exception will need to be drafted and approved during the PA/ED phase of the project.

At the Route 116 West Separation Undercrossing (KP 20.4), the vertical clearance above Route 116 is approximately 4.5 meters. As Route 116 is a conventional highway, the standard vertical clearance required is 4.6 meters. Therefore, the project proposes the lowering of Route 116 by 125 mm to provide the minimum acceptable vertical clearance of 4.6 meters under this structure. For both the Denman Overcrossing and the Route 116 Separation West Undercrossing, the feasibility of lowering the mainline profile and thereby

the need for design exceptions for nonstandard vertical clearances will be further investigated during the PA/ED phase.

4.2.2 Modifications to Existing Structures

The widening of the mainline freeway section will require the widening of the following structures:

- Railroad Avenue Undercrossings (Bridge Nos. 20-166L and 20-166R)
- Sierra Avenue Undercrossings (Bridge Nos. 20-167L and 20-167R)

Both the west and east sides of the structures listed above (two pairs, or four total) will be widened, as described in the structural modification summary provided in Attachment E. Modifications to accommodate mainline widening will also be needed at the following structures:

- Route 101/116 West Grade Separation (Bridge Nos. 20-169L and 20-169R)
- Copeland Creek Structure (box culvert) (Bridge Nos. 20-15L and 20-15R)
- Laguna De Santa Rosa Structure (box culvert) (Bridge Nos. 20-16L and 20-16R)
- Willow Brook Creek Bridge (Bridge Nos. 20-016L and 20-016R)
- Cattle Crossing at KP 20.1 (box culvert)

4.2.3 Realignment of On-ramps

In addition to being widened, the following on-ramps will be realigned to meet current design standards:

- Diagonal on-ramp from southbound Old Redwood Highway to northbound Route 101 in the City of Petaluma
- Diagonal on-ramp from northbound Old Redwood Highway/southbound Commerce Boulevard/eastbound Route 116 to northbound Route 101 in the City of Cotati

Old Redwood Highway runs approximately parallel along the west side of Route 101 from Novato to Petaluma. In Petaluma, Old Redwood Highway crosses over Route 101 on the Denman Overcrossing and begins running approximately parallel on the east side. At this cross-over location, the diagonal on-ramp from southbound Old Redwood Highway to northbound Route 101 will be revised to enable better access for the associated turning movement. The current on-ramp alignment does not allow for adequate approach speeds and driver comfort. The ramp will be realigned to reduce the significant skew and increase the radius for improved operations.

At the Route 116 West Separation in Cotati, Old Redwood Highway runs very close along the east side of Route 101. The existing on-ramp to northbound Route 101 diverges from Old Redwood Highway, and just past this diverge point, northbound Old Redwood Highway becomes Commerce Boulevard. Currently eastbound traffic on Route 116 must turn left and

proceed north on Old Redwood Highway before reaching the on-ramp. This project proposes to reconstruct this on-ramp so that it will diverge directly from Route 116 and conform to standards for a diagonal on-ramp in a diamond interchange (see sheet 8 of 11 in Attachment C). The final alignment of both the on-ramp and the adjacent local streets will be determined in the PA/ED and PS&E phases of the project. Realignment of this on-ramp will involve right of way impacts (see right of way section).

4.2.4 Ramp Metering Facilities

According to the Department's policy, ramp-metering facilities will be provided at all on-ramps within the project limits. These facilities will include items such as mainline detectors, ramp demand and passage detectors, ramp queue detectors, conduits and wiring, signal heads, control cabinets, advance warning signs, and maintenance vehicle pullouts (MVPs), at existing (and proposed, for the Expanded Alternative) on-ramps within the project limits. Ramp metering equipment and facilities will be installed according to the Department's most recent Ramp Meter Design Manual (RMDM). A plan for the potential operation and implementation of these facilities will be drafted at a later date.

4.2.5 HOV Preferential Lanes

Seven of the nine on-ramps within the project limits will be widened for preferential HOV lanes to facilitate the passage of HOV users through the ramp metering system. These ramps, currently single-lane on-ramps, will be widened to transition from two lanes (one mixed-flow, one HOV bypass) at the local street to one lane at the merge area before entering the freeway. In addition, CHP enforcement areas will be provided near the HOV preferential lane at each of these on-ramps. HOV preferential lanes will be provided at the on-ramps serving the following turning movements:

- From southbound Old Redwood Highway to northbound Route 101 (diagonal ramp) in Petaluma
- From northbound Old Redwood Highway to southbound Route 101 (diagonal ramp) in Petaluma
- From Pepper Road/Stony Point Road to southbound Route 101
- From Sierra Avenue to southbound Route 101
- From northbound Old Redwood Highway/southbound Commerce Boulevard/eastbound Route 116 to northbound Route 101 in Cotati
- From eastbound Route 116 to southbound Route 101
- From Rohnert Park Expressway to southbound Route 101

The northbound Old Redwood Highway to southbound Route 101 diagonal ramp will be realigned with the HOV preferential lane implementation. The current ramp alignment will not allow standard ramp features to be included with the widening and HOV preferential lane facilities. The ramp's existing horizontal radius would be widened to allow for standard design features, safety and driver comfort.

The existing loop on-ramps carrying traffic from northbound Old Redwood Highway to northbound Route 101 and from southbound Old Redwood Highway to southbound Route 101 in the City of Petaluma will not be widened for HOV preferential lanes by the proposed project. The highest forecasted peak hour demand for the loops is approximately 607 vehicles for the northbound Old Redwood Highway to northbound Route 101 loop on-ramp and 487 vehicles for the southbound Old Redwood Highway to southbound Route 101 loop on-ramp. Because the traffic volumes are so low on these two loop on-ramps, HOV preferential lanes at these locations would not be of much benefit to HOV travelers. In addition, provision of HOV preferential lanes at these two on-ramps, while maintaining standard design features, would require replacement of the Denman Road Overcrossing (which carries Old Redwood Highway over Route 101). For these reasons, the proposed project does not include HOV preferential lanes at the two loop on-ramps in the Old Redwood Highway/Route 101 interchange in Petaluma. As the RMDM states that “an HOV preferential lane shall be provided at all ramp meter locations,” a fact sheet will need to be drafted and approved for this exception during the next phase of this project.

4.2.6 Climbing Lane at the Cotati Grade

A 3.6-meter-wide truck-climbing lane will be a fourth lane in the northbound direction between north of Old Redwood Highway (KP 13.4) and north of Railroad Avenue to the Cotati Grade Summit (KP 18.0). The overall grade of the Cotati Grade is just over five percent. In order to accommodate the climbing lane, an additional widening of 4.3 m would be required on the outside of the third travel lane (two mixed-flow and one HOV) in the northbound direction of Route 101. The additional widening for the climbing lane will require construction of a retaining wall from approximately KP 15.8 to KP 16.7.

4.3 Expanded Project Alternative

This alternative proposes the following components:

- All proposed facilities as described in the Minimum Project Alternative;
- A 3.6-meter wide auxiliary lane in each direction (northbound and southbound) between Route 116 West (KP 20.7) and Rohnert Park Expressway (KP 22.0); and
- Two new on-ramps and one new off-ramp at Railroad Avenue (KP 17.2), which, along with the existing off-ramp to Railroad Avenue, will form a standard diamond interchange.

The addition of auxiliary lanes between Route 116 West and Rohnert Park Expressway would reduce critical weaving activity and improve mainline traffic flow within this section. Vehicle delay and safety are also expected to improve with the addition of northbound and southbound auxiliary lanes. The southbound auxiliary lane will require right of way takes as explained in the right of way data sheet (Attachment I).

Currently, the only access point between Railroad Avenue and Route 101 is a diagonal off-ramp leading from northbound Route 101 to Railroad Avenue. To complete the diamond interchange, the Expanded Project Alternative proposes the construction of three new ramps: one northbound on-ramp and two southbound on- and off-ramps. These modifications will create a full access diamond interchange at Route 101/Railroad Avenue. Additional costs will be associated with these interchange improvements, including a partial right of way take on the east side of Route 101 (see Attachment I) and two additional retaining walls at the following locations:

- From approximately KP 17.4 to KP 17.2, along the west side of the new off-ramp from southbound Route 101; and
- From approximately KP 17.2 to 17.7, along the west side of the new on-ramp to northbound Route 101.

The new ramps at the Railroad Avenue interchange are not expected to cause weaving problems with respect to adjacent interchanges, as the nearest interchange is more than 1.5 km from Railroad Avenue. However, a study of potential impacts to the brake check area near KP 18.0 on southbound Route 101 is recommended during the PA/ED phase.

To minimize the impact and cost of the Expanded Project Alternative, design exceptions may be considered in the PA/ED phase of the project. Conceptual approval for any design exceptions that will definitely be needed has already been obtained from the Headquarters Design Reviewer, as stated in the Design Scoping Checklist (Attachment F). Approval of the design fact sheets will be conducted in the next phase of project development. To reduce right of way and/or construction impacts, additional design exceptions may be pursued in the future for a reduced shoulder width at the southbound auxiliary lane between Route 116 West and Rohnert Park Expressway and for a reduced shoulder width and deceleration length at the new off-ramp from southbound Route 101 to Railroad Avenue.

5. SYSTEM AND REGIONAL PLANNING

Highway 101, or US 101, is one of the earliest state routes. It was originally recommended for the state highways map in 1896 and was adopted into the highway system in 1909. Construction began in 1912 and was initially commissioned in 1926. Route 101 was one of the original US highways and originally extended from the US border with Mexico to the southern part of the State of Washington. Route 101 from the Golden Gate Bridge to the Oregon state line is also named the “Redwood Highway,” as this road segment travels through the redwood forests of northern California. The Redwood Highway was named by the Assembly Concurrent Resolution 174, Chapter 269 in 1957. US 199 is also shown on some maps as “Redwood Highway”. In 1947, the concept for Route 101 was upgraded from a two-lane road to a four-lane freeway/expressway with limited access. The widening was mostly completed by 1975. The addition of new ramps or freeway access points will require

coordination and approval from all local and State agencies, along with a new or revised Freeway Agreement, in the next phase of the project.

The Transportation Corridor Concept Report (TCCR), formerly known as the Route Concept Report, is the Department's long-term planning document that establishes a twenty-year planning concept for a given state transportation corridor. Outside the twenty-year time frame, it also provides an estimate of the corridor needs. However, since most adopted analytical methodologies conform to a twenty-year period, any concepts developed beyond this period are speculative.

The proposed project lies within the Route 101 North corridor. This is the north/south corridor route that spans from the southern end of the Golden Gate Bridge to the Sonoma/Mendocino County line in the north.

Currently, the TCCR for the Route 101 North Corridor is being updated by the Department. Preliminary work has so far included collection and compilation of relevant system planning strategies and policies from recent state, regional and local planning and programming documents.

State

The report *Interregional Transportation Strategic Plan - A Plan to Guide Development of the Interregional Transportation System* (ITSP, June 1998)¹, prepared by the Department, contains strategies, principles, objectives and criteria for the optimal integration of the state's transportation systems. The report defines the segment of Route 101 between Los Angeles and San Francisco Bay area as a "high capacity facility" and a "focus route." One of the strategies to meet the TCCR is to provide continuous improvement of Route 101 to cater to increased interregional travel demand. The facility standard recommended is a four-to ten-lane freeway from Los Angeles through the San Francisco Bay Area to Cloverdale. The HOV lanes proposed for this PSR(PDS) are consistent with this concept.

Governor Davis' "Traffic Congestion Relief Plan" (TCRP, July 2000) contained a project list², which authorized funding in the amounts of \$21 million for Route 101 widening from Novato to Petaluma, \$15 million for a Route 101 reversible HOV lane through San Rafael, \$6 million for the redesign and construction of the Steele Lane interchange, and \$37 million for the implementation of a commuter rail passenger service from Cloverdale south to San Rafael in Marin and Sonoma Counties.

Regional

The 1998 Metropolitan Transportation Commission's (MTC) Regional Transportation Plan (RTP) has been recently updated with the Draft 2001 RTP, dated August 10, 2001. The RTP describes the strategies and investments required to maintain, manage and improve the transportation network within the nine counties in the Bay Area. The Draft 2001 RTP covers the years 2001-2025 and is updated every 3 years. The HOV lanes proposed by this

PSR(PDS) are included under Track 1 Funds. Track 1 Funds are the discretionary state and federal funds that may be available from the RTP over the long term.

The Bay Area Transportation Blueprint for the 21st Century, adopted by the MTC in March 2000, includes highway improvements such as HOV gap closures. Closures of HOV gaps are recommended along Route 101 in Marin and Sonoma Counties, in particular from Petaluma to Novato. Since this PSR(PDS) proposes HOV lanes just north of Novato, it is consistent with one of the goals expressed in the Blueprint, i.e., a continuous HOV lane system.

The District System Management Plan (DSMP, 1988) included transportation strategies to effectively improve the transportation system in the region. In particular, it recommended HOV and ramp metering facilities for Route 101 through Marin County. The HOV lanes proposed in this PSR(PDS) are consistent with this objective.

The Sonoma/Marin Multimodal Transportation and Land Use Study (1997), which was sponsored by the Sonoma County Transportation Authority (SCTA), Marin Countywide Planning Agency, and the Department, discussed transportation improvements that involved matching land use patterns with transportation options. It also recommended construction of HOV lanes for Route 37 to Atherton Avenue.

The Sonoma 101 Variable Pricing Study (MTC, January 2000) evaluated the operational and financial feasibility of variable-priced toll lane options on Route 101 between Route 37 and the Petaluma River Bridge (which overlaps with the “Marin-Sonoma Narrows” project limits). The narrows area is a gateway between Sonoma County and Marin/San Francisco Counties. Often, the segment is congested throughout various times of the day. The study alternatives looked at five options with additional variations³:

- Base Case- No HOV (2005 only)
- Option A- Northbound (NB) and Southbound (SB) continuous HOV Lanes/No Toll (2015 Base Case)
- Option B- NB and SB Buffer-Separated Toll/HOV Lanes
- Option C- Reversible HOV Lane(s)/No Toll
- Option D- Reversible Toll/HOV Lane(s)

The analysis results indicated the following: HOV lanes increase corridor capacity and person-carrying capacity, thereby creating a time-savings for commuters; there is no significant difference in corridor performance between HOV and HOV/Toll options; and there is no significant difference in corridor performance when using time-variable toll rates.

6. ENVIRONMENTAL DETERMINATION

Under the requirements of the National Environmental Policy Act of 1969 (NEPA) and the California Environmental Quality Act (CEQA), environmental analysis and technical reports

will be prepared for the project. Based on the information gathered and environmental issues identified to date, it has been determined that an Environmental Impact Statement/Report (EIS/R) would be the appropriate environmental documentation for this project. The Federal Highway Administration (FHWA) will be the lead agency for the project under NEPA, while the Department will be the lead agency under CEQA.

6.1 Natural Environment

In order to accommodate the widening of Route 101 for HOV lanes, new footings, columns, piles, and/or culvert extensions would be necessary. As a result, there is a potential for impacts to wetland and riparian habitat. Based on field surveys, the following are believed to be likely U.S. Army Corps of Engineers (ACOE) jurisdictional wetlands:

- Willow Brook Creek crossing (riparian/riverine habitat);
- Petaluma River flats just north of the Willow Brook Creek crossing (seasonal wetlands);
- Northbound Route 101 off-ramp at Railroad Avenue (willow riparian/seasonal wetlands on the east road edge);
- Saddle on Cotati Grade (Meacham Hill) north and south of the Route 101 brake check area (willow riparian along headwaters of Laguna de Santa Rosa both east and west of highway);
- West Sierra/Roblar Avenue (headwaters willow riparian to Laguna de Santa Rosa);
- Route 101/116 West separation southbound on- and off-ramps (seasonal wetlands located in outside ditches); and
- Just south of the southbound Route 101 on-ramp at Rohnert Park Expressway (tributary to Laguna de Santa Rosa willow riparian and seasonal wetlands).

During the Project Approval/Environmental Document (PA/ED) stage of the project, an ACOE wetland delineation would be conducted in order to determine the impacts to wetlands and riparian habitat throughout the project area. Due to the proposed alignment widening through the above-maintained wetland habitats and potential impacts to wetlands and riparian habitat, it is likely that an ACOE Section 404 individual permit or nationwide permit would be required under Section 404 of the Clean Water Act.

An individual permit is necessary for projects affecting more than three acres that result in potentially significant impacts. A nationwide permit is necessary for activities that result in minimal impacts to wetland habitats (less than three hectares or 152 m of lineal stream).

If it is determined that the project would require an individual permit due to potentially significant impacts to wetlands, the Department will be required to follow the NEPA/404 Integration Process which requires early coordination and consultation with the ACOE, U.S. Fish and Wildlife Service (USFWS), Environmental Protection Agency (EPA), and the National Marine Fisheries Service (NMFS). During the NEPA/404 Integration Process a Least Environmentally Damaging Practicable Alternative (LEDPA) would be determined.

Once the LEDPA has been determined and the environmental review process completed, the Department would apply for the ACOE Section 404 individual permit.

If it is determined that the project would result in less than significant impacts to wetlands and riparian habitat, a nationwide permit would be required and the NEPA/404 Integration Process would not be necessary.

In order to accommodate all elements of the project, including the minimum 9-meter setback/recovery zone from the edge of the traveled way, numerous 30- to 40-year-old redwoods and several California oaks may have to be removed. Due to increased urbanization in the project corridor, many of the existing trees no longer meet the 9-meter setback/recovery zone required under Topic 309.1 of the Caltrans Highway Design Manual. Trees within the recovery zone present concerns related to vehicle and public safety, fire risk and management, and homeless habitat and therefore will be removed. A determination of the exact number of trees removed will be made during the next phase of the project (PA/ED).

6.2 Biological Resources

In order to determine the extent of sensitive biological resources within the project area several sources of information were reviewed including a database query of the California Department of Fish and Game (DFG), a query of California Natural Diversity Database (CNDDDB) for the Cotati 12.5-kilometer (7.5-mile) U.S. Geological Survey (USGS) quadrangle map, and a USFWS species list for Cotati Quad. Also contacted were DFG fisheries biologist Bill Cox, fisheries consultant Michael Faucet, National Marine Fisheries Service biologist Dick Butler and DFG biologist Alan Buckman.

The CNDDDB database indicates that there are no known occurrences of any sensitive plant or animal species in the current road alignment. Based on USFWS Cotati Quad query and known CNDDDB occurrences in the project area vicinity, there are potentially suitable habitats for western pond turtle (*Clemmys marmorata*), California tiger salamander (*Ambystoma californiense*) and California red-legged frog (*Rana aurora ssp. draytonii*). Surveys by a qualified biologist for the above species in the project area should be conducted during the next phase of the project.

Based on local fisheries experience, Central Coast steelhead (*Oncorhynchus mykiss*) are known to occur in Willow Brook Creek. No known California freshwater shrimp (*Syncaria pacifica*) populations occur in the Petaluma River watershed on the upper portions of Laguna de Santa Rosa (Bill Cox, DFG, pers. comm.). Consultation with USFWS and NMFS will be required and a DFG 1601 Streambed Alteration Agreement will possibly be required for potential impacts to the above sensitive species due to road widening.

The northern most portion of the project from Route 116 West to the Rohnert Park Expressway is located within the Santa Rosa Plain. The ACOE Santa Rosa Plain Vernal

Pool Preservation Plan was never implemented, although the USFWS has developed a Section 7 programmatic consultation for ACOE permits in the Santa Rosa Plain. The programmatic plan deals with endangered plant species in one of two ways, either two years of plant surveys to determine presence or accepting their presence and mitigating for the loss. Two growing seasons of plant monitoring are proposed for the active channel of the Laguna de Santa Rosa and right of way drainage ditches. It could be argued that neither habitat is suitable for the sensitive species, and in accordance with USFWS biologist consultation, the monitoring requirements may be waived.

During the PA/ED phase, a Natural Environmental Study (NES) and a Biological Assessment (BA) will be prepared. If any federally listed plant or animal species are found to be present within the project area, consultation with the USFWS will be necessary in order to comply with Section 7 of the Endangered Species Act.

6.3 Cultural Resources

A cultural resources inquiry to the Northwest Information Center of the California Historical Resources Information System was made. The record search indicated that there is a high likelihood of identifying Native American and historic cultural resources in the project area. A separate query to Mick Hayes, Archaeologist for the Department, also suggested areas of possible sensitive Native American resources along the proposed route. In both cases it was recommended that a qualified archaeologist conduct further archival and field study during the PA/ED phase. Also recommended was a thorough review of the Office of Historic Preservation records regarding potential impacts to possible historic buildings, structures and objects 45 years or older. To address cultural requirements, a Historic Property Survey Report (HPSR), a Historic Survey Report (HSR), an Archaeological Survey Report (ASR), and a Historic Architectural Survey Report (HASR) will be required, in accordance with Section 106 of the National Historical Preservation Act of 1966.

6.4 Noise

The removal of trees along the edge of right of way (ROW) could lead to the perception of increased noise in those locations. In addition, portions of the proposed freeway widening will move the noise source closer to the nearby receptors. In general, it is expected that there will be a 2-3 decibel increase in noise as a result of the widening of the highway and long-term additional capacity. Noise impacts would generally occur at receptors located within 152 meters of the noise source. Located along the Route 101 corridor are various land uses including residences, churches, and recreation areas, which are within 152 meters of the highway and would potentially be sensitive to increased noise levels. Listed below are the primary locations of residential land use:

- On the west side of Route 101 just north of Old Redwood Highway (trailer park)
- On both sides of Route 101 at Orchard Lane
- On both sides of Route 101 at Railroad Avenue

- On both sides of Route 101 between Sierra Avenue and Route 116 West
- On the east side of Route 101 between Route 116 West and Rohnert Park Expressway

Other potential sensitive receptors include the open space environmental conservation land located adjacent to Route 101 between Enterprise Drive and Southwest Boulevard in Rohnert Park and the Petaluma Golf Range adjacent to the southbound exit at Old Redwood Highway in Petaluma. Possible locations for noise barriers (soundwalls) include areas where residences are immediately adjacent to Route 101 such as the west side of highway just north of Old Redwood Highway and along both sides of the highway between Sierra Avenue and Route 116 West. During the PA/ED phase, a Traffic Noise Impact Report would be conducted. Based on the results of the Noise Impact Report, a determination of the need for and, if necessary, the locations for all noise barriers would be made. Installation of noise barriers between the highway and right of way edge would not create any areas that are inaccessible for maintenance. Adequate access gates would be installed on the walls next to existing frontage roads or where off-street parking is available.

6.5 Air Quality

The project is located within the San Francisco Bay Area Air Basin. The air basin is currently designated as a non-attainment area for ozone on the federal level and for ozone and particulate matter (PM₁₀) on the state level. In addition, the basin is a carbon monoxide maintenance area on both the state and federal level. As a result, the project must be evaluated to determine if it would cause or contribute to new violations of air quality standards, worsen existing violations, or interfere with timely attainment of standards. This evaluation will be based on reviewing the project's traffic analysis as well as local transportation plans and the Bay Area's component of the State Implementation Plan during the PA/ED phase. The analysis would also evaluate the potential for exposing sensitive receptors in the project area to substantial pollutant concentrations, at locations such as the bicycle/pedestrian path in the open space environmental conservation land adjacent to Route 101 and the Petaluma Golf Range adjacent the Old Redwood Highway off-ramp.

6.6 Visual Resources

Some of the proposed construction activities would alter the visual character of the existing highway corridor for both motorists traveling along Route 101 and for views of the highway from adjacent properties. Such activities include removing several mature trees along the roadway, constructing noise barriers, cutting away a portion of Cotati Grade including the addition of retaining walls, and constructing an embankment along the east side of Route 101 adjacent to the Cotati Grade. A visual impact study will be conducted during the PA/ED phase. If the visual impacts associated with the project are found to significantly degrade the visual character of the highway corridor, the project will conflict with both the Scenic Design Combining District and Scenic Resources Combining District of the Sonoma

County General Plan. Both Districts are designed to preserve the visual character and scenic beauty in the region or county.

Mitigation measures are possible including tree replacement and aesthetic designs for retaining walls and potential noise barriers. Appropriate measures would need to be developed during the project design phase.

6.7 Water Quality

Route 101 crosses three waterways in the project area: Copeland Creek, Laguna de Santa Rosa, and Willow Brook Creek. Copeland Creek and Laguna de Santa Rosa are part of the Russian River watershed and are under jurisdiction of the North Coast Regional Water Quality Control Board (NCRWQCB). Willow Brook Creek is part of the Petaluma River watershed and is under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (SFRWQCB). If the project work limits include or are close to water sensitive areas that may be affected during construction activities or if an ACOE Individual Section 404 permit is required, a 401 Water Quality Certification must be obtained from both RWQCBs.

Due to the potential for water quality impacts, the project would have to follow the requirements of the Caltrans National Pollution Discharge Elimination System (NPDES) permit Order No. 99-06-DWQ, CAS000003 issued by the State Water Resources Control Board (SWRCB). The permit encompasses construction and non-construction activities, compliance with the requirements of the NPDES General Permit for Construction Activities, and possible incorporation of Permanent Control Measures (PCM) or drainage improvements for the benefit of water quality. All graded and disturbed areas will be treated with permanent erosion control materials commensurate to the site condition and erosion potential.

The Statewide NPDES permit also includes implementation of Best Management Practices (BMP). Storm water treatment control BMPs are devices, structures, and facilities that treat storm water runoff, thereby protecting waterways and wetlands and benefiting water quality. Examples include biofiltration devices, dry weather flow diversions, percolation ponds, detention basins, or landscaping features such as grassy swales. A determination of types of storm water treatment control BMPs and the need for any additional right of way in order to accommodate them would be made during the PA/ED phase. The Right of way Data Sheet included in this PSR(PDS) does not include any additional right of way that may be needed for permanent storm water treatment control. In addition, the NPDES permit requires notification of the appropriate RWQCBs if the project involves the reuse of Aerially Deposited Lead (ADL) contaminated soil, in order for the RWQCBs to determine any need for the development of Waste Discharge Requirements (WDL).

Standard Special Provision 07-345 shall be included in the Plans, Specifications, and Estimates (PS&E) to address water pollution control and Storm Water Pollution Prevention

Plans (SWPPP). In addition, because the project is within the boundaries of the SFRWQCB, a Conceptual Storm Water Pollution Prevention Plan (CSWPPP) would need to be submitted to the SFRWQCB 30 days prior to the start of construction.

During the PA/ED phase of the project, a Flood Plain Evaluation will need to be completed in order to determine the extent of the flood plain within the project area and potential impacts associated with the project.

6.8 Hazardous Waste

The project would require grading of unpaved areas of both the median and the outer shoulders. Soil sampling and subsequent testing for lead would be necessary prior to construction in order to determine if any special handling of the excavated soil would be necessary. If the soil contains high levels of lead then it may be deemed hazardous waste as defined in Title 22 CCR Sec. 66260.1-66263.12 and Sec. 66268.1-66268.14. In addition, worker protection may be required as outlined in Title 8 CCR Sec. 1532.1. If any yellow thermoplastic and/or paint striping is proposed to be disturbed it would also be sampled and analyzed for lead chromate. If soil sampling and testing for lead is done, and if it is determined that ADL contaminated soil is present, a decision will need to be made whether to invoke the Department of Toxic and Substance Control (DTSC) Variance (Variance No. 00-H-VAR-01) for reuse of the soil. It is strongly recommended that both the NCRWQCB and SFRWQCB be notified promptly if it is decided to invoke the variance. Depth to groundwater within the proposed project limits varies from 2.4 to 5 meters below the surface, according to environmental regulatory agency files. Depth to groundwater should be generally suitable for placement of lead contaminated soil, as long as the soil is placed between a minimum of 1.5 meters above the ground water table and covered with 0.6 meters of clean soil as required by the DTSC variance 00-H-VAR-01 for re-use of lead impacted soil.

Due to proposed bridge widening over several creeks, an asbestos survey will need to be conducted to satisfy the National Emission Standard for Hazardous Air Pollutants (NESHAP) 40 CFR Part 61. Asbestos may be present in wrapped utility lines, bridge expansion joints, concrete-asbestos water lines or other building materials. Asbestos containing material that are present and that would be impacted by construction activities would need to be removed by an asbestos contractor prior to general construction. A new regulation which will be effective November 13, 2001 regulates naturally occurring asbestos in soil and rock during grading with regard to airborne exposures (Title 17 CCR Sec. 93106).

An Initial Site Assessment (ISA) (see Attachment H) was conducted to determine whether soil contaminated with various hazardous materials is present, and where it is likely to be encountered during the proposed widening of Route 101. The evaluation included searches of government databases of hazardous materials sites, review of environmental regulatory agency files for specific sites, review of historical aerial photographs for undocumented

industrial sites, and a field inspection of the subject corridor. The search area begins 91 meters north of the intersection of Highway 101 with the Rohnert Park Expressway, covers an area 107 meters on each side of the freeway center, and ends 183 meters south of the intersection with Old Redwood Highway.

The search identified 22 hazardous waste sites within the search area and nine other incident sites. Of the 22 sites identified within the search area, five are petroleum release sites under investigation, five are petroleum release sites where a regulatory agency has issued a remedial action completion certification, one site is a solid waste landfill, and the remainder are sites that generate small quantities of hazardous materials or which have active underground fuel storage tanks and no reported releases. Small quantity hazardous waste generators include body shops, auto maintenance shops, and dry cleaning facilities. Sites listed as small quantity hazardous waste generators are considered to have low potential to have impacted soil or groundwater and none are known to have released regulated materials into the environment. Sites that have been issued remediation completion certificates are also considered to have low potential for impact to the subject corridor; however, some isolated residual contamination could be present in those areas.

Of the nine incident sites that could not be located, one is now a remediated gasoline spill which occurred on the freeway approximately 0.8 kilometers north of the Route 116 West Interchange, two are solid waste landfill sites outside the search area, and the remainder are sites that represent incidents or sites with low potential for having impacted the search area. Of the nine unmapped incidents, only the referenced spill represents a significant known release of hazardous materials.

A total of six sites were identified within the project search area where known releases of regulated constituents are currently under investigation or where a remediated site poses significant potential for impact to soil which may be encountered during the proposed freeway widening project. Of these six sites, three pose significant potential for encountering soil or groundwater contamination during the proposed project. The remediated gasoline spill on the freeway has likely caused some residual impact to soil that may be encountered during the proposed project. Soil and groundwater contamination originating at the 7360 Commerce site does not appear to have migrated closer to the freeway than the western edge of Commerce Boulevard, however, buried utilities below Commerce Boulevard could have acted as preferential flow pathways for contamination. Gasoline-impacted soil could be encountered around buried utilities below the proposed northbound freeway on-ramp at Route 116 West if those utilities are connected to buried utilities below Commerce Boulevard.

At four of five sites still under investigation, groundwater flow directions are unlikely to have allowed migration of contaminated groundwater into the area to be disturbed by the development of the proposed project. Only the 605 Sierra site has significant unknown potential to have impacted groundwater within the proposed project area. Depth to water in

the vicinity of the 605 Sierra site is not known but is inferred from topography to flow south toward Sierra Avenue.

Two areas of potential concern were identified during review of aerial photographs. The property at the proposed southbound Route 101 on-ramp at Old Redwood Highway and the proposed path for the northbound Route 101 on-ramp from the Route 116 West have some potential to have undocumented releases of hazardous materials that could impact the project. Further investigation into the historical uses of these two areas should be conducted to determine what potential those uses have for causing contamination which may be of concern during the proposed construction. The necessity for sampling of soil should be determined based on the likelihood that specific historical land uses have caused contamination. No known releases of regulated constituents have been identified directly below the paths of the proposed northbound Route 101 on-ramp at Route 116 West or the proposed path of the southbound freeway on-ramp at Old Redwood Highway. These sites should be investigated in the PA/ED phase along with the other identified sites if necessary. The impact to these sites is not likely to be significant, however, additional evaluation is recommended due to their long history of use and their close proximity to the project.

The impact of remedial investigations related to known hazardous materials sites (except ADL issues) along the corridor on project schedule should not exceed the known two years required during the PA/ED phase of the project for evaluation of biological resources and can be completed concurrently. The impact of remedial actions during construction on project schedule is anticipated to be minimal. Costs of hazardous materials investigation and remediation (except ADL issues) are not likely to exceed \$750,000 and may be considerably less. The impact of hazardous materials remediation on project scope, cost, and schedule will be fully defined during the PA/ED phase of the project.

Based on review of the information described in this ISA, it is recommended that the following actions be taken to further evaluate or mitigate the presence of hazardous materials that may be encountered during the development of the proposed project:

- Additional investigation into historical uses of two areas (northbound Route 101 on-ramp at Route 116 West and southbound Route 101 on-ramp at Old Redwood Highway) of the proposed project should be conducted. Based on the potential for historical site uses to have resulted in undocumented releases to soil or groundwater that may be encountered during the proposed project, recommendations should be made for confirmation sampling or no further action as appropriate.
- Pathways of buried utilities which pass near the 7360 Commerce Boulevard site and the 5153 Old Redwood Highway site should be reviewed and evaluated for potential that they may have acted as conduits for migrating contamination from those sites to the vicinity of the proposed Route 101 on-ramps northbound at Route 116 West and southbound at Old Redwood Highway, respectively.
- As part of the next phase of the project, a sampling plan should be developed to identify the concentrations of probable regulated constituents likely to be present in

soil affected by the proposed project. Areas to be investigated should include the spill location on Route 101 0.8 kilometers north of Route 116 West, areas identified through research into historical site use as warranting additional investigation, utility conduits in the vicinity of the northbound Route 101 on-ramp at Route 116 West if results of additional research warrant investigation, and evaluation of lead concentrations in any soil affected by the project.

When concentrations of lead and other identified constituents in affected soil are known, a proposed plan for management of that soil (potentially including re-use or disposal as appropriate) should be submitted to both the NCRWQCB and the SFRWCQB and DTSC for review and concurrence.

A Preliminary Site Investigation (PSI) will need to be conducted during the next phase of the project to further evaluate the presence of hazardous materials in the project area.

6.9 Section 4(f)

There are two resources adjacent to the highway corridor that are protected by Section 4(f) of the Department of Transportation Act of 1966. One is an urban greenway adjacent to Route 101 in Rohnert Park and the other is a golf driving range in Petaluma. If the project requires permanent use of these areas or results in proximity impacts on recreational and/or historical resources, a Section 4(f) evaluation will be conducted. In order to use a portion of these resources it must be demonstrated that there is no feasible and prudent alternative to such use, that the amount and location of the land to be used does not impair the use of the remaining land for its intended purpose, all possible project planning efforts have been made to minimize harm to the resources, and the officials having jurisdiction over the resource agree in writing with the assessment of impacts of the proposed project on the Section 4(f) resources.

The City of Rohnert Park maintains a landscaped buffer area between Route 101 and Commerce Boulevard from Enterprise Drive to Southwest Boulevard. This urban greenway includes a path for pedestrians and bicyclists, large redwood trees, and open grass areas. It is designated as Open Space for Environmental Conservation by the City and is protected by Section 4(f). The other Section 4(f) resource is the Petaluma Golf Range located on the west side of Route 101 adjacent to the southbound off-ramp for Old Redwood Highway. However, the proposed project has no anticipated impacts on these Section 4(f) resources.

6.10 Farmlands

Construction of the project would not impact any farmland or grazing pasture located adjacent to the highway corridor. All work would be within the existing highway right of way in areas passing through the agricultural land.

6.11 Land Use

Although the majority of the proposed construction would occur within the existing highway right of way, some right of way acquisition will be required. A total of 24 parcels, including full and partial takes, would be affected under the Expanded Project Alternative. Relocation assistance will be provided in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. Some of the partial takes would result in the loss of several parking spaces for a restaurant and small portions of vehicle storage areas for two automobile dealerships adjacent to eastbound Old Redwood Highway to the southbound Route 101 on-ramp. Temporary construction easements for staging and material storage would use two vacant parcels located along Railroad Avenue.

Due to the number of parcel takes, it has been determined that a Community Impact Study would be conducted during the next phase of the project.

6.12 Plans and Policies

The proposed widening of Route 101 is generally consistent with the transportation elements of general plans of Sonoma County and the Cities of Rohnert Park, Cotati, and Petaluma. From the Sonoma County General Plan, the proposed project is consistent with the following transportation elements:

- Goal CT-2: Provide and maintain a highway system capacity to serve projected highway travel demand in 2005 at acceptable service levels.
- CT-2m: Designate U.S. Highway 101 (Route 101) as a freeway for its entire length in Sonoma County. Improve it to freeway standards as a high priority.
- CT-2n: Develop the planned additional travel lanes on Route 101 to allow for high occupancy vehicles (HOV) and transit use during peak commute periods.
- CT-3j: HOV lanes may be designated on Route 101. They should be continuous, linking major population centers with employment centers. If HOV lanes are used, make them available for mixed flow traffic during non-peak periods.

From the City of Rohnert Park General Plan, the project would be consistent with the following transportation goals:

- TR-J: Reduce peak-hour traffic congestion and associated impacts, including air pollution, energy consumption, and noise.
- TR-K: Reduce the need for roadway improvements by making more efficient use of existing roads, bikeways, transit service, and other transportation facilities and services.

The project is not expected to encroach on the open space environmental conservation land

adjacent to Route 101, so it would not be in conflict with Policy OS-1 of the Rohnert Park General Plan which states, “Work with Sonoma County to ensure that land in the Planning Area designated as Open Space in Rohnert Park General Plan is maintained in rural use or as permanent open space.” However, the determination of whether the project encroaches to

adjacent open space environmental conservation lands will be made during the PA/ED and PS&E phases.

7. RIGHT OF WAY

The following potential right of way impacts are associated with each “Build” alternative. The Right of Way Data Sheet and the Utility Information Sheet are provided in Attachment I. A more detailed estimate of right of way and utility impacts will be determined in the PA/ED phase of the project.

Minimum Project Alternative: The proposed right of way take for this alternative involves 23 parcels and an estimated cost of \$5.2 million (current value). There are some public open space and recreation areas in the project vicinity but no Section 4(f) right of way takes are anticipated.

Expanded Project Alternative: There are 24 parcels required for this alternative. There are three full takes, two commercial properties with improvements and one residential property with a single-family residence and a duplex. The 21 other parcels are partial takes with no improvements affected. The proposed right of way take for this alternative involves an estimated cost of \$5.4 million (current value). The most significant right of way impacts compared to the Minimum Project Alternative is the additional amount of right of way needed along the west side of Route 101 in the southbound direction between Route 116 West and Rohnert Park Expressway and the partial parcel impact at Railroad Avenue for the southbound off-ramp. There may be an additional impact due to property access at Railroad Avenue for the properties on the east side of Route 101 adjacent to the proposed northbound on-ramp. There are some public open space and recreation areas in the project vicinity but no Section 4(f) right of way takes are anticipated.

8. FUNDING/SCHEDULING

Funding for the PA/ED phase and PS&E phase for this project will be programmed by the SCTA in the 2002 STIP. Tables 5 and 6 represent proposed project funding and scheduling. All dates beyond the approval of the PA/ED are subject to change based on funding availability. Planning level cost estimate information for both alternatives are provided in Attachment D.

TABLE 5
CAPITAL OUTLAY ESTIMATE (in 1,000's)

Alternative	Range for Total Cost* (Current Costs)	Range for Total Cost** (Escalated Costs)	STIP Funds	Names of Other Funding Sources
Minimum Project Alternative	\$80,000-\$90,000	\$100,000-115,000	YES	GARVEE Bonds
Expanded Project Alternative	\$95,000-\$105,000	\$120,000-\$135,000	YES	GARVEE Bonds

* Range for Total Cost includes Capital Costs for Right of Way (ROW) and Construction.

**Capital costs have been escalated at a rate of 3.5% per year, seven years forward from 2001 to 2008.

Note: GARVEE bonds = Grant Anticipated Revenue Vehicle (GRAVEE) Bonds.

TABLE 6
PROPOSED PROJECT SCHEDULE

Milestone/Phase	Proposed Completion Fiscal Year
PSR/PDS	December 2001
PA/ED	2006/2007
PS&E	2007/2008
R/W Certification	2007/2008
Ready to List	2008
Construction Complete	2010

Note: This schedule was developed assuming that consultants will prepare the PA/ED. The schedule also assumes that risk design for PS&E will begin in early 2004.

9. PROGRAMMING RECOMMENDATION

The Department has determined that the support costs for the different phases of the project are as follows: PA/ED: \$4.6 million, PS&E: \$7.1 million, totaling \$11.7 million. The Sonoma County Transportation Agency (SCTA) has requested that \$10 million for this project be programmed in the 2002 STIP. The remaining \$1.7 million will be programmed at a later date. Therefore, it is recommended that the amounts of \$4 million and \$6 million be programmed into the 2002 STIP for the project's PA/ED and PS&E phases, respectively.

The project alternatives identified in this report are to be studied in further detail in the PA/ED phase to determine the preferred alternative and to initiate the PS&E phase once a preferred alternative is selected. The project alternatives may be further defined and/or revised to include or exclude various project components or improvements as determined and justified in the PA/ED and PS&E phases.

10. DEPARTMENTAL CONTACTS

Nino Cerruti, Project Manager	(510) 286-5129
Sandy L. Wong, Office Chief, Advance Planning	(510) 286-5676
Cristina Ferraz, Senior Transportation Engineer	(510) 286-3890
Rachel Donovan, Oversight Project Engineer	(510) 622-1674
Mike Thomas, Coordinator, Project Planning and Design	(510) 286-4687
Gordon Brown, Design Reviewer, Project Planning and Design	(510) 622-5932
Saaïd Fakharzadeh, Office Chief, Design North Counties	(510) 286-6011
Jonathan Lee, Branch Chief, Design North Counties	(510) 286-4684
Albert Yee, Office Chief, Highway Operations	(510) 286-4542
Michael Church, Branch Chief, Operational Research	(510) 286-4642
Mike Kerns, Branch Chief, MRN, NAP, SOL, SON	(510) 622-5430
Richard Fahey, Branch Chief, Regional Modeling/GIS	(510) 286-5761
Paul Ma, Branch Chief, Project Level Forecasting	(510) 286-5140
Shein Lin, Branch Chief, Traffic Management	(510) 286-5264
Linda Emadzadeh, Right of Way Project Coordinator	(510) 286-5461
Celia McCuaig, Branch Chief, Hazardous Materials	(510) 286-5659
Eric Drayner, Environmental Engineer	(510) 286-6218
John Bither, Technical Liaison, Structures	(916) 227-8605

11. CONTACTS OUTSIDE THE DEPARTMENT

Suzanne Wilford, Executive Director, SCTA	(707) 565-5373
Connie Preston, Project Manager, Vali Cooper & Associates	(510) 215-0264
Randy Altshuler, Principal in Charge, Parsons Brinckerhoff	(415) 243-4614
John Komaru, Project Manager/Engineer, Parsons Brinckerhoff	(415) 243-4639
Mike Kincaid, Project Manager/Engineer, Winzler & Kelly	(415) 443-8326
Misha Schwartz, Biologist, Winzler & Kelly	(707) 444-8330

12. ATTACHMENTS

- A. Location Map
- B. Typical Cross Sections
- C. Project Layout Sheets
- D. Preliminary PSR (PDS) Cost Estimate
- E. Structural Modifications
- F. Design Scoping Checklist
- G. Traffic Scoping Checklist
- H. Environmental Scoping Checklist
- I. Right of Way Data Sheet

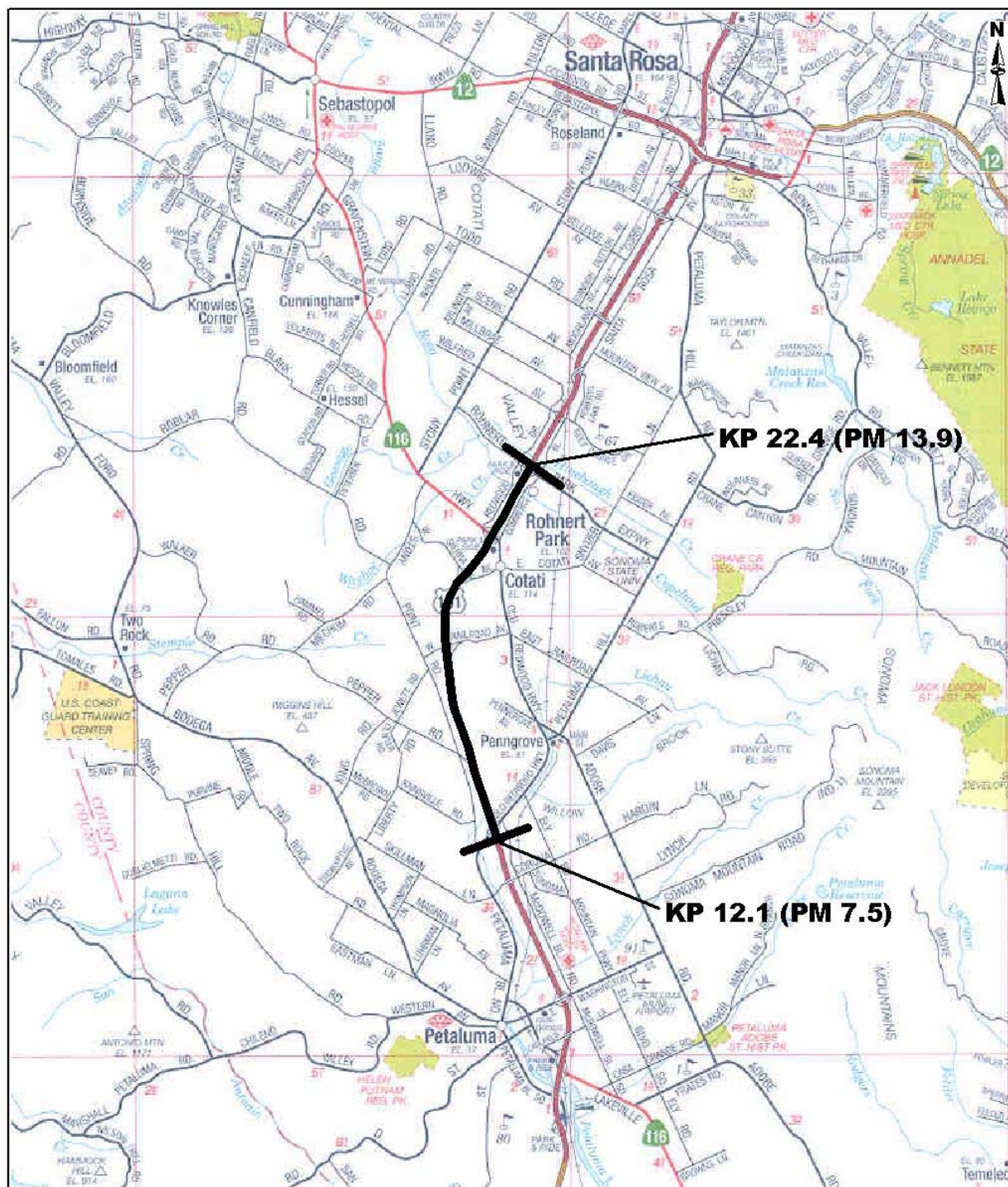
ATTACHMENT A

LOCATION MAP



PROJECT STUDY AREA

Source: California State Automobile Association, 1999

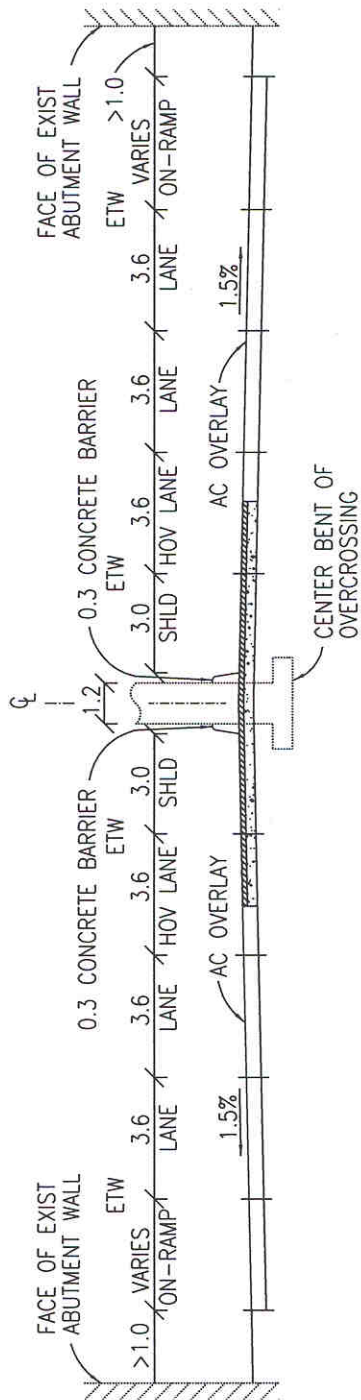


PROJECT STUDY LIMITS

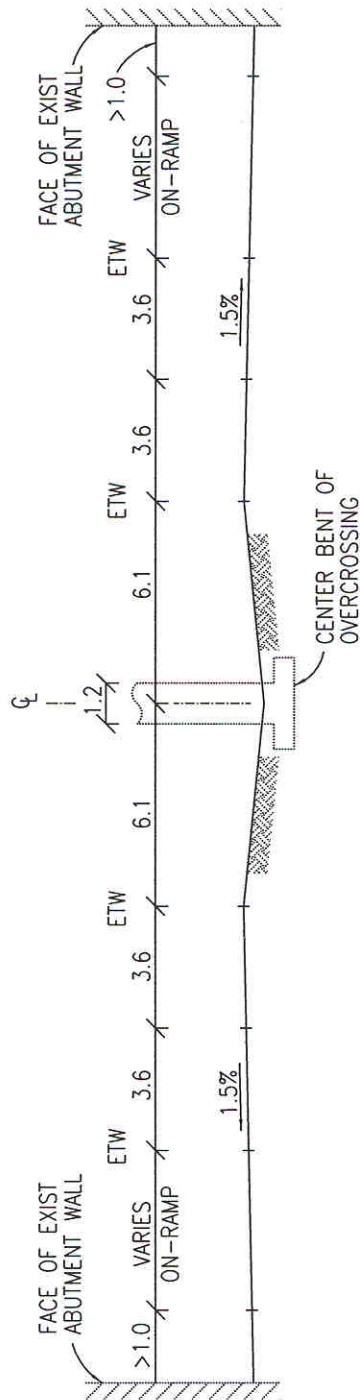
Source: California State Automobile Association, 2000

ATTACHMENT B

TYPICAL CROSS SECTIONS

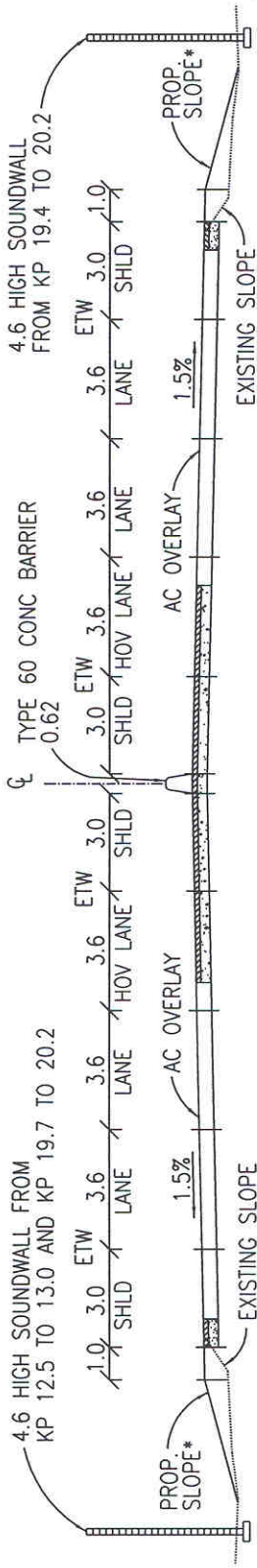


PROPOSED TYPICAL CROSS-SECTION AT
OLD REDWOOD HIGHWAY - KP 12.3



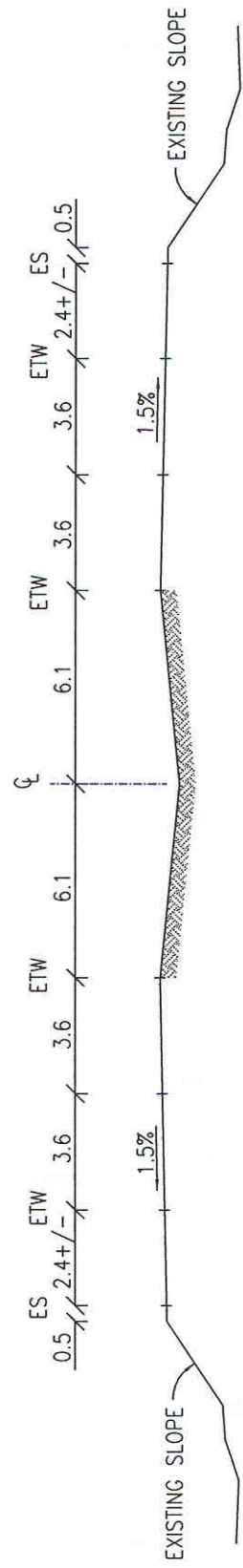
EXISTING TYPICAL CROSS-SECTION AT
OLD REDWOOD HIGHWAY - KP 12.3

04-SON-101-KP 12.1 / 22.4 (PM 7.5 / 13.9)
04-219-OA180K
MINIMUM ALTERNATIVE
HIGHWAY 101 IMPROVEMENTS
DECEMBER 2001
SHEET 1 OF 7



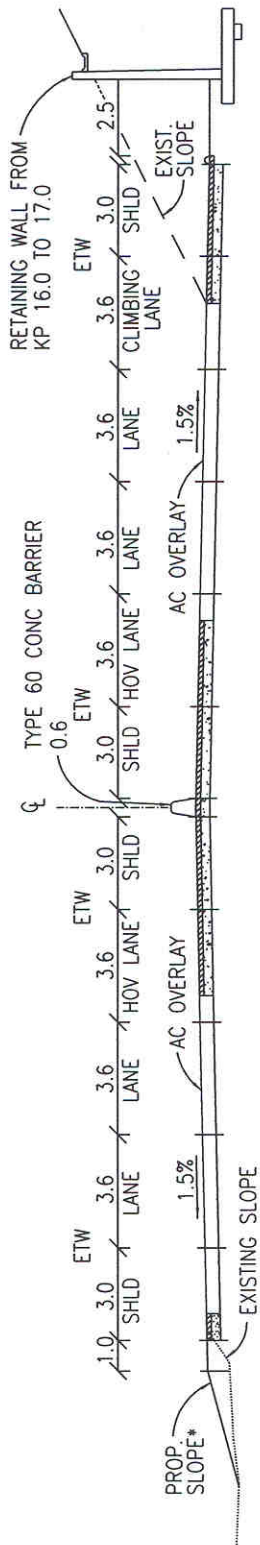
* SLOPE VARIES: 1:2 TYPICAL; 1:4 IN SHALLOW FILL AREAS.

PROPOSED TYPICAL ROADWAY CROSS-SECTION FROM KP 12.1 TO 12.3, KP 12.3 TO 13.4, KP 18.0 TO 22.9



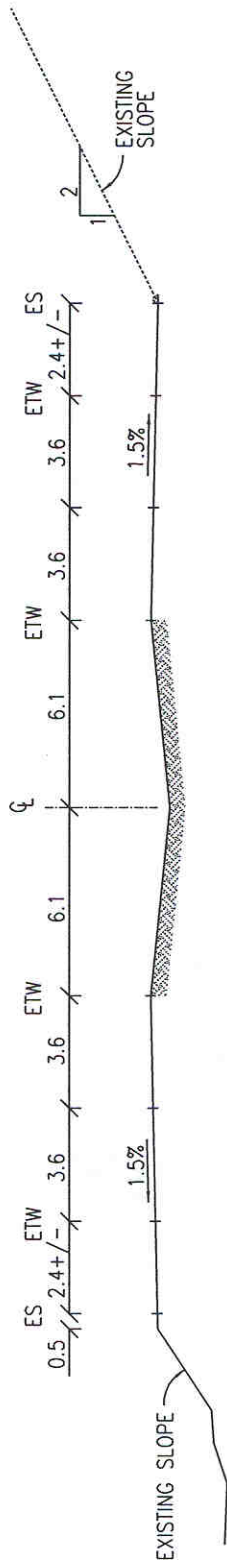
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04-SON-101-KP 12.1 / 22.4 (PM 7.5 / 13.9)
 04-219-0A180K
 MINIMUM ALTERNATIVE
 HIGHWAY 101 IMPROVEMENTS
 DECEMBER 2001
 SHEET 2 OF 7



* SLOPE VARIES: 1:2 TYPICAL; 1:4 IN SHALLOW FILL AREAS.

PROPOSED TYPICAL CROSS-SECTION FOR TRUCK CLIMBING LANE FROM KP 13.4 TO KP 18.0

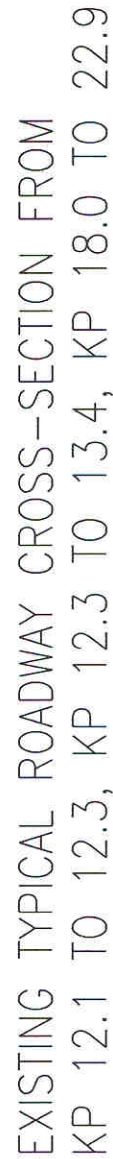


EXISTING TYPICAL CROSS-SECTION FOR TRUCK CLIMBING LANE FROM KP 13.4 TO KP 18.0

04-SON-101-KP 12.1 / 22.4 (PM 7.5 / 13.9)
04-219-0A180K
MINIMUM ALTERNATIVE
HIGHWAY 101 IMPROVEMENTS
DECEMBER 2001
SHEET 3 OF 7



PROPOSED TYPICAL ROADWAY CROSS-SECTION FROM
KP 12.1 TO 12.3, KP 12.3 TO 13.4, KP 18.0 TO 22.9



04-S0N-101-KP 12.1 / 22.4 (PM 7.5 / 13.9)

04-219-0A180K

EXPANDED ALTERNATIVE

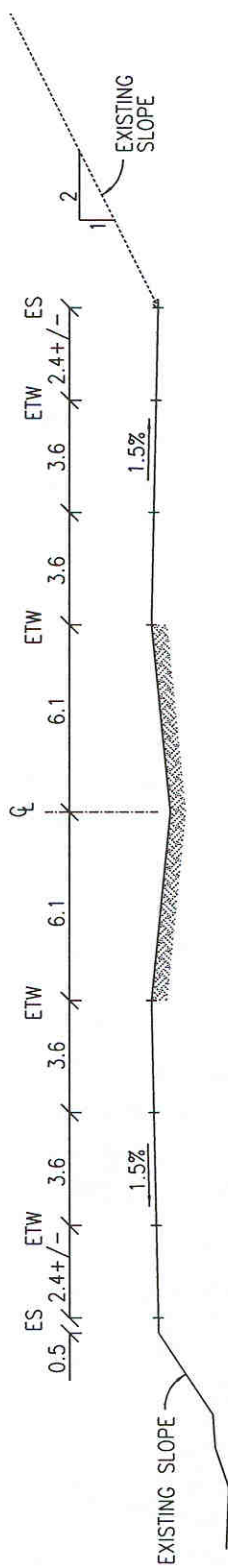
Highway 101 Improvements

DECEMBER 2001

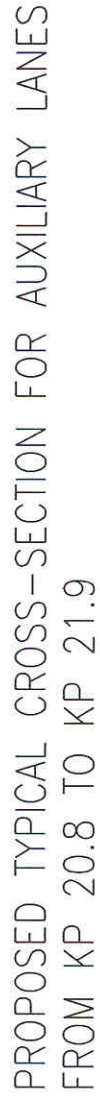
SHEET 5 OF 7



EXISTING TYPICAL CROSS-SECTION FOR TRUCK CLIMBING LANE
FROM KP 13.4 TO KP 18.0



04-SON-101-KP 12.1 / 22.4 (PM 7.5 / 13.9)
04-219-0A180K
EXPANDED ALTERNATIVE
HIGHWAY 101 IMPROVEMENTS
DECEMBER 2001
SHEET 6 OF 7



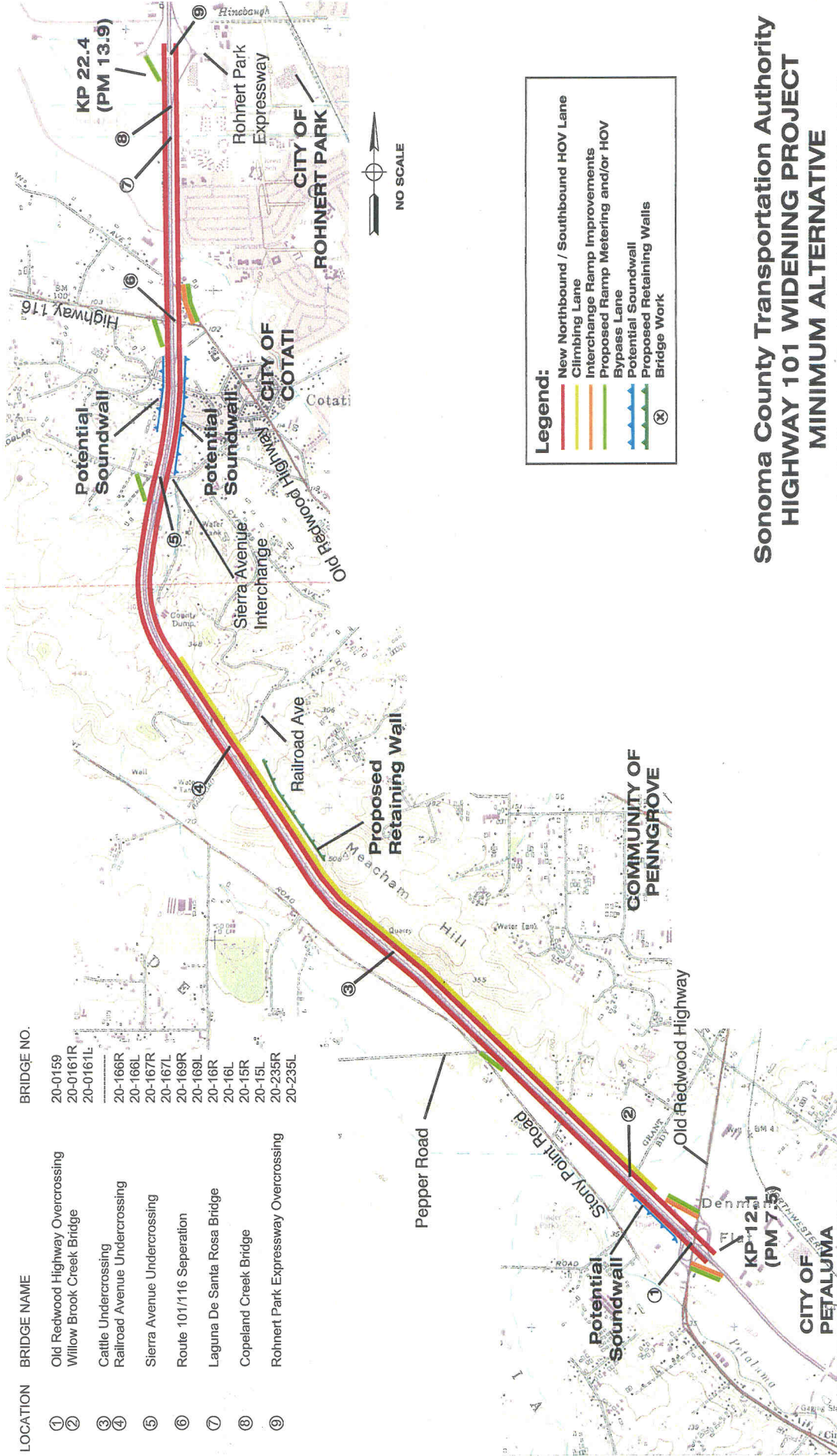
04-SON-101-KP 12.1 / 22.4 (PM 7.5 / 13.9)
04-219-0A180K
EXPANDED ALTERNATIVE
HIGHWAY 101 IMPROVEMENTS
DECEMBER 2001
SHEET 7 OF 7

ATTACHMENT C

PROJECT LAYOUT SHEETS

BRIDGE SUMMARY

LOCATION	BRIDGE NAME	BRIDGE NO.
①	Old Redwood Highway Overcrossing	20-0159
②	Willow Brook Creek Bridge	20-0161R
③	Cattle Undercrossing	20-0161L
④	Railroad Avenue Undercrossing	20-1666R
⑤	Sierra Avenue Undercrossing	20-1666L
⑥	Route 101/116 Separation	20-1677R
⑦	Laguna De Santa Rosa Bridge	20-1677L
⑧	Copeland Creek Bridge	20-169R
⑨	Rohnert Park Expressway Overcrossing	20-16R
		20-16L
		20-15R
		20-15L
		20-235R
		20-235L

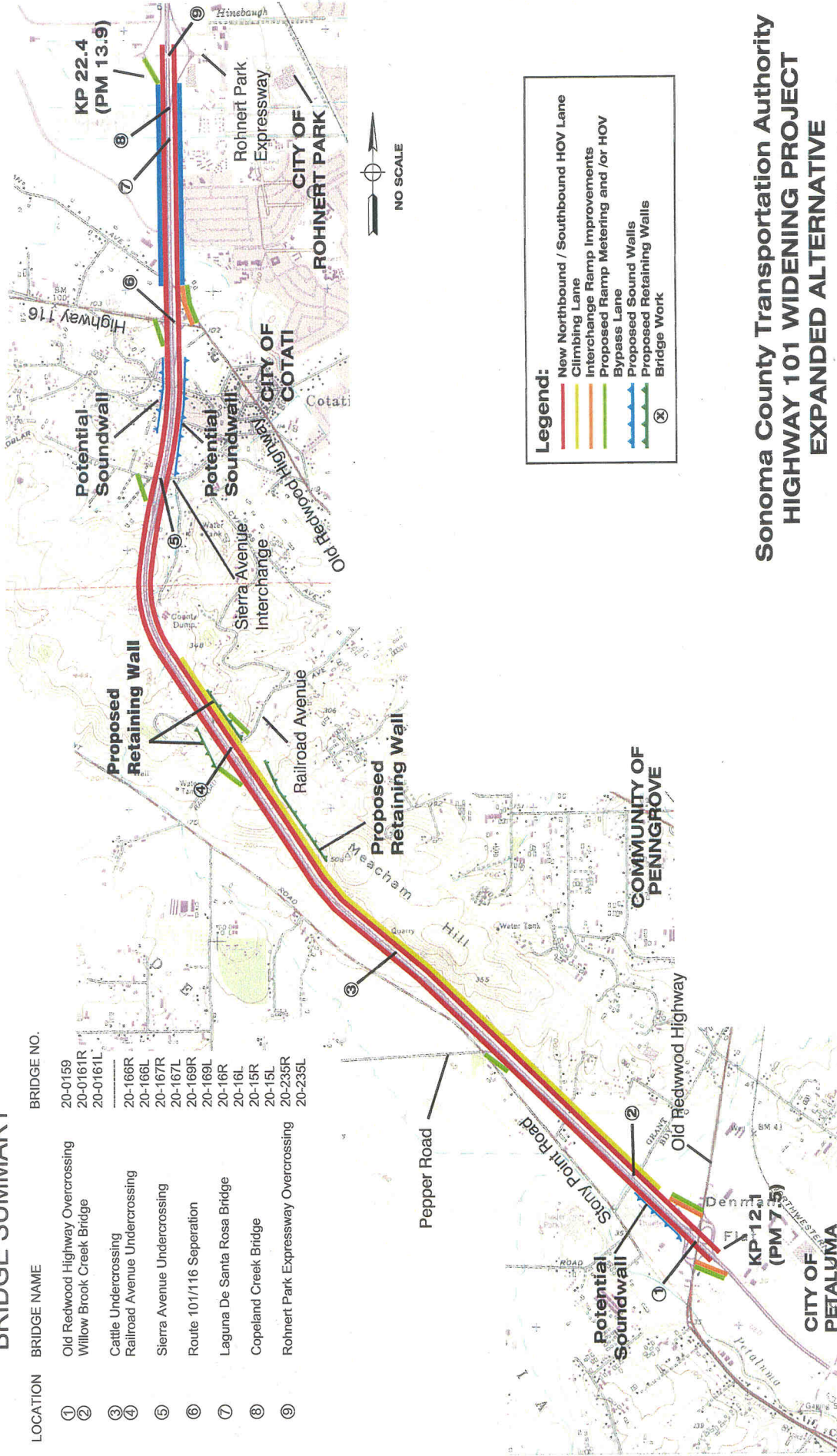


Sonoma County Transportation Authority HIGHWAY 101 WIDENING PROJECT MINIMUM ALTERNATIVE

04-SON-101-KP 12.1 / 22.4 (PM 7.5 / 13.9)
04-219-0A180K

BRIDGE SUMMARY

LOCATION	BRIDGE NAME	BRIDGE NO.
①	Old Redwood Highway Overcrossing	20-0159
②	Willow Brook Creek Bridge	20-0161R
③	Cattle Undercrossing	20-0161L
④	Railroad Avenue Undercrossing	20-166R
⑤	Sierra Avenue Undercrossing	20-167R
⑥	Route 101/116 Separation	20-167L
⑦	Laguna De Santa Rosa Bridge	20-169R
⑧	Copeland Creek Bridge	20-169L
⑨	Rohnert Park Expressway Overcrossing	20-168R
		20-168L
		20-15R
		20-15L
		20-235R
		20-235L



Sonoma County Transportation Authority HIGHWAY 101 WIDENING PROJECT EXPANDED ALTERNATIVE

04-SON-101-KP 12.1 / 22.4 (PM 7.5 / 13.9)

04-219-0A180K

ATTACHMENT D

PRELIMINARY PSR (PDS) COST ESTIMATE



Project Study Report -- Project Development Support Cost Estimate

District-County-Route	04-Son-101
KP(PM)	KP 12.1-22.4 (PM 7.5-13.9)
EA	04-219-0A180K
Date	Dec-18-2001

PROJECT DESCRIPTION:

Limits Route 101 between Old Redwood Highway in Petaluma to Rohnert Park Expressway in Sonoma County

Proposed Improvements Widen Route 101 between the project limits from four to six lanes with an HOV lane in each direction. A Truck-climbing lane on the northbound Route 101 at the Cotati Grade is also proposed. Modifications to existing on-ramps to include ramp metering facilities and HOV preferential (bypass) lanes. All improvements would meet Caltrans design standards.

Minimum Project Alternative

SUMMARY OF ITEMS:

TOTAL ROADWAY ITEMS	\$ 73,506,547
TOTAL STRUCTURE ITEMS	\$ 5,136,750
TOTAL ENVIRONMENTAL MITIGATION ITEMS	\$ 2,984,100
SUBTOTAL CONSTRUCTION	\$ 81,627,397
TOTAL RIGHT OF WAY (Current Value)	\$ 5,229,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$ 86,856,397

Reviewed by Signature
PSR 1 Branch Chief

Date 12-19-01

Approved by Project Signature
Manager

Date 12-19-01

ATTACHMENT D

District-County-Route	04-Son-101
KP(PM)	KP 12.1-22.4 (PM 7.5-13.9)
EA	04-219-0A180K
Date	Jan-10-2002

MINIMUM PROJECT ALTERNATIVE

I. ROADWAY ITEMS

<u>Section 1 - Earthwork</u>	<u>Quantity</u>	<u>Unit of Measure</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Clearing & Grubbing	30	HA	\$8,500.00	\$255,000	
Roadway Excavation	44,000	M3	\$12.00	\$528,000	
Roadway Fill	225,000	M3	\$25.00	\$5,625,000	
Roadway Fill Contingency (10% of Fill)	1	LS	\$562,500.00	\$562,500	
Slotted Plastic Pipe (Edge Drain)					
Roadway	20,900	M	\$2.50	\$52,250	
Ramps	3,350	M	\$2.50	\$8,375	
Remove Base and Surfacing - Ramps	30,000	M2	\$75.00	\$2,250,000	
Develop Water Supply	1	LS	\$30,000.00	\$30,000	
				<u>Total Earthwork</u>	<u>\$9,311,125</u>

<u>Section 2 - Pavement Structural Section</u>	<u>Quantity</u>	<u>Unit of Measure</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
PERMANENT ROAD WORK:					
Assumes an Overlay 64mm, and TI of 12 and R value of 12.					
Asphalt Concrete Overlay (64mm)					
Roadway	24,578	TONNE	\$70.00	\$1,720,475	
Ramps	493	TONNE	\$70.00	\$34,539	
Asphalt Concrete (180mm)					
Roadway	96,545	TONNE	\$70.00	\$6,758,150	
Ramps	6,545	TONNE	\$70.00	\$458,150	
Climbing Lane	7,365	TONNE	\$70.00	\$515,550	
Treated Permeable Base (75mm)					
Roadway	17,700	M3	\$60.00	\$1,062,000	
Ramps	1,200	M3	\$60.00	\$72,000	
Climbing Lane	1,350	M3	\$60.00	\$81,000	
Aggregate Base (500mm)					
Roadway	118,000	M3	\$50.00	\$5,900,000	
Ramps	8,000	M3	\$50.00	\$400,000	
Climbing Lane	9,000	M3	\$50.00	\$450,000	
Pavement Reinforcing Fabric	236,000	M2	\$1.00	\$236,000	
Install AC Dike	9,000	M	\$10.00	\$90,000	
				<u>Total Structural Section</u>	<u>\$17,777,864</u>

District-County-Route	04-Son-101
PM	KP 12.1-22.4 (PM 7.5-13.9)
EA	04-219-0A180K

Section 3 - Drainage

	<u>Quantity</u>	<u>Unit of Measure</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Drainage Inlets					
Roadway	42	EA	\$1,200	\$50,400	
Ramps	16	EA	\$1,200	\$19,200	
Install 600mm Storm Drain Pipe					
Roadway	1,100	M	\$35	\$38,500	
Ramps	120	M	\$35	\$4,200	
Cross Drainage	900	M	\$600	\$540,000	
Underdrains	1,200	M	\$38	\$45,600	
Horizontal Drains	800	M	\$72	\$57,600	
			<u>Total Drainage</u>		<u>\$755,500</u>

Section 4 - Specialty Items

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Retaining Wall					
Roadway	5,400	M2	\$1,076	\$5,810,400	
Noise Barriers (Sound Wall - Masonry)	8,640	M2	\$200	\$1,728,000	
Salvage/Remove MBGR	10,440	M	\$45	\$469,800	
Concrete Barrier Type 60	10,440	M	\$100	\$1,044,000	
Water Pollution Control Plan (SWPPP)	1	LS	\$820,000	\$820,000	
Permanent Storm Water Treatment/Control	1	LS	\$1,400,000	\$1,400,000	
Temporary Water Pollution Control	1	LS	\$65,000	\$65,000	
Permanent Erosion Control	5	HA	\$8,000	\$40,000	
Hwy Planting/Repl Planting/Irrigtn Sys	1	LS	\$1,000,000	\$1,000,000	
Landslide Mitigation	1	LS	\$500,000	\$500,000	
			<u>Total Specialty Items</u>		<u>\$12,877,200</u>

Section 5 - Traffic Items

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Permanent Signing	20	EA	\$350.00	\$7,000.00	
Misc Permanent Signing (10% of Permanent Signing)	1	LS	\$700.00	\$700.00	
Lighting (Incl. Conduit/Wiring) 200 ft. o.c.					
Ramps	70	EA	\$5,500.00	\$385,000.00	
Pavement Striping					
Roadway	79,500	M	\$3.30	\$262,350.00	
Ramps	10,000	M	\$3.30	\$33,000.00	
Climbing Lane	4,500	M	\$3.30	\$14,850.00	
Misc Pavement Striping (10% of Pavement Striping)	1	LS	\$31,020.00	\$31,020.00	
Transportation Management Plan	1	LS	\$1,230,000.00	\$1,230,000.00	
Traffic Operations System (TOS) Components	1	LS	\$3,400,000.00	\$3,400,000.00	
			<u>Total Traffic Items</u>		<u>\$5,363,920.00</u>

SUBTOTAL SECTIONS 1-5 **\$46,085,609.46**

District-County-Route 04-Son-101
PM KP 12.1-22.4 (PM 7.5-13.9)
EA 04-219-0A180K

Section 6 - Minor Items

			<u>Unit Cost</u>	<u>Section Cost</u>
Subtotal Sections 1-5	\$46,085,609	10%	\$4,608,560.95	
			<u>Total Minor Items</u>	<u>\$4,608,560.95</u>

Section 7 - Roadway Mobilization

Subtotal Sections 1-5	\$46,085,609			
Minor Items	\$4,608,561			
Subtotal Sections 1-6	\$50,694,170	10%	\$5,069,417.04	
			<u>Total Roadway Mobilization</u>	<u>\$5,069,417.04</u>

Section 8 - Roadway Additions

Supplemental				
Subtotal Sections 1-5	\$46,085,609			
Minor Items	\$4,608,561			
Sum	\$50,694,170	10%	\$5,069,417.04	
Contingencies				
Subtotal Sections 1-5	\$46,085,609			
Minor Items	\$4,608,561			
Sum	\$50,694,170	25%	\$12,673,542.60	
			<u>Total Roadway Additions</u>	<u>\$17,742,959.64</u>
			TOTAL ROADWAY ITEMS	<u>\$73,506,547.08</u>
				(Total of Sections 1-8)

Estimate Prepared by: Carol Yee Phone: 415-243-4722 Date: 12/17/01

Estimate Checked by: John Komaru Phone: 415-243-4639 Date: 12/17/01



Project Study Report -- Project Development Support Cost Estimate

District-County-Route	04-Son-101
KP(PM)	KP 12.1-22.4 (PM 7.5-13.9)
EA	04-219-0A180K
Date	Dec-18-2001

PROJECT DESCRIPTION:

Limits Route 101 between Old Redwood Highway in Petaluma to Rohnert Park Expressway in Sonoma County

Proposed Improvements Widen Route 101 between project limits and on-ramp modifications and the truck-climbing lane identified in the Minimum Project Alternative. There is the addition of auxiliary lanes between Route 116 and Rohnert Park Expressway, construction of three new ramps at Railroad Avenue.

Expanded Project Alternative

SUMMARY OF ITEMS:

TOTAL ROADWAY ITEMS	\$ 87,061,350
TOTAL STRUCTURE ITEMS	\$ 5,460,750
TOTAL ENVIRONMENTAL MITIGATION ITEMS	\$ 3,133,146
SUBTOTAL CONSTRUCTION	\$ 95,655,246
TOTAL RIGHT OF WAY (Current Value)	\$ 5,429,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$ 101,084,246

Reviewed by Signature
PSR 1 Branch Chief

Approved by Project Signature
Manager

Date 12-19-01

Date 12-19-01

ATTACHMENT D

District-County-Route	04-Son-101
KP(PM)	KP 12.1-22.4 (PM 7.5-13.9)
EA	04-219-0A180K
Date	Jan-10-2002

EXPANDED PROJECT ALTERNATIVE

I. ROADWAY ITEMS

<u>Section 1 - Earthwork</u>	<u>Quantity</u>	<u>Unit of Measure</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Clearing & Grubbing	32	HA	\$8,500.00	\$272,000	
Roadway Excavation	45,000	M3	\$12.00	\$540,000	
New Southbound Off-ramp	11,000	M3	\$12.00	\$132,000	
Roadway Fill	325,000	M3	\$25.00	\$8,125,000	
Roadway Fill Contingency (10% of Fill)	1	LS	\$812,500.00	\$812,500	
Slotted Plastic Pipe (Edge Drains)					
Roadway	20,900	M	\$2.50	\$52,250	
Ramps	4,600	M	\$2.50	\$11,500	
Remove Base and Surfacing - Ramps	30,000	M2	\$75.00	\$2,250,000	
Develop Water Supply	1	LS	\$30,000.00	\$30,000	
				<u>Total Earthwork</u>	<u>\$12,225,250</u>

<u>Section 2 - Pavement Structural Section</u>	<u>Quantity</u>	<u>Unit of Measure</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
PERMANENT ROAD WORK:					
Assumes an Overlay 64mm, and TI of 12 and R value of 12.					
Asphalt Concrete Overlay (64mm)					
Roadway	24,578	TONNE	\$70.00	\$1,720,475	
Ramps	493	TONNE	\$70.00	\$34,539	
Asphalt Concrete (180mm)					
Roadway	96,545	TONNE	\$70.00	\$6,758,150	
Ramps	6,545	TONNE	\$70.00	\$458,150	
Climbing Lane	7,365	TONNE	\$70.00	\$515,550	
Auxiliary Lanes	3,860	TONNE	\$70.00	\$270,200	
Treated Permeable Base (75mm)					
Roadway	17,700	M3	\$60.00	\$1,062,000	
Ramps	1,988	M3	\$60.00	\$119,250	
Climbing Lane	1,350	M3	\$60.00	\$81,000	
Auxiliary Lanes	653	M3	\$60.00	\$39,150	
Aggregate Base (500mm)					
Roadway	118,000	M3	\$50.00	\$5,900,000	
Ramps	13,250	M3	\$50.00	\$662,500	
Climbing Lane	9,000	M3	\$50.00	\$450,000	
Auxiliary Lanes	4,350	M3	\$50.00	\$217,500	
Pavement Reinforcing Fabric	265,000	M2	\$1.00	\$265,000	
Install AC Dike	9,000	M	\$10.00	\$90,000	
				<u>Total Structural Section</u>	<u>\$18,643,464</u>

Section 3 - Drainage

	<u>Quantity</u>	<u>Unit of Measure</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Drainage Inlets					
Roadway	42	EA	\$1,200.00	\$50,400	
Ramps	28	EA	\$1,200.00	\$33,600	
Install 600mm Storm Drain Pipe					
Roadway	1,130	M	\$35.00	\$39,550	
Ramps	260	M	\$35.00	\$9,100	
Cross Drainage	900	M	\$600.00	\$540,000	
Underdrains	1,200	M	\$38.00	\$45,600	
Horizontal Drains	800	M	\$72.00	\$57,600	
			<u>Total Drainage</u>		<u>\$775,850</u>

Section 4 - Specialty Items

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Retaining Wall					
Roadway	5,400	M2	\$1,076.00	\$5,810,400	
Ramps	220	M2	\$1,076.00	\$236,720	
NB On-ramp at RR Avenue	2,450	M2	\$1,076.00	\$2,636,200	
SB Off-ramp at RR Avenue	1,100	M2	\$1,076.00	\$1,183,600	
Noise Barriers (Sound Wall - Masonry)	8,640	M2	\$200.00	\$1,728,000	
Salvage/Remove MBGR	10,440	M	\$45.00	\$469,800	
Concrete Barrier Type 60	10,440	M	\$100.00	\$1,044,000	
Water Pollution Control Plan (SWPPP)	1	LS	\$980,000.00	\$980,000	
Permanent Storm Water Treatment/Control	1	LS	\$1,400,000.00	\$1,400,000	
Temporary Water Pollution Control	1	LS	\$65,000.00	\$65,000	
Permanent Erosion Control	5	HA	\$8,000.00	\$40,000	
Hwy Planting/Repl Planting/Irrigtn Sys	1	LS	\$1,000,000.00	\$1,000,000	
Landslide Mitigation	1	LS	\$500,000.00	\$500,000	
			<u>Total Specialty Items</u>		<u>\$17,093,720</u>

Section 5 - Traffic Items

	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Item Cost</u>	<u>Section Cost</u>
Permanent Signing	20	EA	\$350.00	\$7,000	
Misc Permanent Signing (10% of Permanent Signing)	1	LS	\$700.00	\$700	
Lighting (Incl. Conduit/Wiring) 200 ft. o.c.					
Ramps	110	EA	\$5,500.00	\$605,000	
Pavement Striping					
Roadway	79,500	M	\$3.30	\$262,350	
Ramps	13,800	M	\$3.30	\$45,540	
Climbing Lane	4,500	M	\$3.30	\$14,850	
Auxiliary Lanes	2,400	M	\$3.30	\$7,920	
Misc Pavement Striping (10% of Pavement Striping)	1	LS	\$32,274.00	\$32,274	
Transportation Management Plan	1	LS	\$1,470,000.00	\$1,470,000	
Traffic Operations System (TOS) Components	1	LS	\$3,400,000.00	\$3,400,000	
			<u>Total Traffic Items</u>		<u>\$5,845,634</u>

SUBTOTAL SECTIONS 1-5 **\$54,583,918**

District-County-Route	04-Son-101
<u>PM</u>	KP 12.1-22.4 (PM 7.5-13.9)
<u>EA</u>	04-219-0A180K

Section 6 - Minor Items

			<u>Unit Cost</u>	<u>Section Cost</u>
Subtotal Sections 1-5	\$54,583,918	10%	\$5,458,392	
			<u>Total Minor Items</u>	<u>\$5,458,392</u>

Section 7 - Roadway Mobilization

Subtotal Sections 1-5	\$54,583,918			
Minor Items	\$5,458,392			
Subtotal Sections 1-6	\$60,042,310	10%	\$6,004,231	
			<u>Total Roadway Mobilization</u>	<u>\$6,004,231</u>

Section 8 - Roadway Additions

Supplemental				
Subtotal Sections 1-5	\$54,583,918			
Minor Items	\$5,458,392			
Sum	\$60,042,310	10%	\$6,004,231	
Contingencies				
Subtotal Sections 1-5	\$54,583,918			
Minor Items	\$5,458,392			
Sum	\$60,042,310	25%	\$15,010,578	
			<u>Total Roadway Additions</u>	<u>\$21,014,809</u>
			<u>TOTAL ROADWAY ITEMS</u>	<u>\$87,061,350</u>
				(Total of Sections 1-8)

Estimate Prepared by: <u>Carol Yee</u>	Phone: <u>415-243-4722</u>	Date: <u>12/17/01</u>
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Estimate Checked by: <u>John Komaru</u>	Phone: <u>415-243-4639</u>	Date: <u>12/17/01</u>
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District-County-Route	04-Son-101
KP(PM)	KP 12.1-22.9 (PM 7.5-13.9)
EA	04-219-0A180K
Date	Jan-10-2002

SUMMARY OF STRUCTURE MODIFICATIONS COSTS

II. STRUCTURE ITEMS

MINIMUM PROJECT ALTERNATIVE

	Structure (1)	Structure (2)	Structure (3)	Structure (4)	Structure (5)	Structure (6)	Structure (7)	Section Cost (\$)
Structure Name	Route 101/116 Separation	Sierra Avenue Undercrossing	Railroad Avenue Undercrossing	Copeland Creek Bridge	Laguna De Santa Rosa Bridge	Willow Brook Creek Bridge	Cattle Undercrossing (KP 20.1)	
Structure Type	Bridge	Bridge	Bridge	Bridge	Bridge	Bridge	Box Structure	
Bridge Number	20-169 R/L	20-167 R/L	20-166 R/L	20-15 R/L	20-16 R/L	20-0161 R/L	not available	
Structure Cost (\$)								
Structure Widening Cost (\$)	925,000	975,000	1,300,000	175,000	85,000	240,000	105,000	
TOTAL Cost for Structure (\$)	925,000	975,000	1,300,000	175,000	85,000	240,000	105,000	
Subtotal Structures 1-7								\$ 3,805,000
Contingency (Subtotal Structures 1-7 x 35%)								\$ 1,331,750
TOTAL STRUCTURES ITEMS (\$)								\$ 5,136,750
(Sum of Total Cost for Structures + Contingency)								

EXPANDED PROJECT ALTERNATIVE

	Structure (1)	Structure (2)	Structure (3)	Structure (4)	Structure (5)	Structure (6)	Structure (7)	Section Cost (\$)
Structure Name	Route 101/116 Separation	Sierra Avenue Undercrossing	Railroad Avenue Undercrossing	Copeland Creek Bridge	Laguna De Santa Rosa Bridge	Willow Brook Creek Bridge	Cattle Undercrossing (KP 20.1)	
Structure Type	Bridge	Bridge	Bridge	Bridge	Bridge	Bridge	Box Structure	
Bridge Number	20-169 R/L	20-167 R/L	20-166 R/L	20-15 R/L	20-16 R/L	20-0161 R/L	not available	
Structure Cost (\$)								
Structure Widening Cost (\$)	925,000	975,000	1,300,000	300,000	200,000	240,000	105,000	
TOTAL Cost for Structure (\$)	925,000	975,000	1,300,000	300,000	200,000	240,000	105,000	
Subtotal Structures 1-7								\$ 4,045,000
Contingency (Subtotal Structures 1-7 x 35%)								\$ 1,415,750
TOTAL STRUCTURES ITEMS (\$)								\$ 5,460,750
(Sum of Total Cost for Structures + Contingency)								

Estimate Prepared by: John Sprinkle Phone: 415-283-4970 Date: 12/17/01

Estimate Checked by: John Komaru Phone: 415-243-4639 Date: 12/17/01

District-County-Route	04-Son-101
KP(PM)	KP 12.1-22.4 (PM 7.5-13.9)
EA	04-219-0A180K
Date	Jan-10-2002

ENVIRONMENTAL MITIGATION COSTS

Description	Quantity	Unit of Measure	Unit Price	Item Cost
Minimum Project Alternative				
Hazardous Waste Mitigation Work				
Lead and Hydrocarbon Exposure Monitoring	1	LS	\$75,000.00	\$ 75,000
Mitigation of Hydrocarbon contaminated soil (Offsite disposal)	1	LS	\$117,500.00	\$ 117,500
Mitigation of Aerial Deposited Lead (ADL) contaminated soil (Offsite disposal)	1	LS	\$2,068,600.00	\$ 2,068,600
Imported fill to replace exported soil (5,750 cubic meters)	1	LS	\$207,500.00	\$ 207,500
			<u>Sub Total</u>	<u>\$ 2,468,600</u>
Wetland Mitigation				
Riparain/Wetlands Mitigation & Monitoring	1	LS	\$500,000.00	\$ 500,000
Sensitive Secies Construction Monitoring	1	LS	\$15,500.00	\$ 15,500
			<u>Sub Total</u>	<u>\$ 515,500</u>
Total For Minimum Project Alternative:			\$	2,984,100

Expanded Project Alternative

Environmental Mitigation				
Hazardous Waste Mitigation Work	1			
Lead and Hydrocarbon Exposure Monitoring	1	LS	\$79,500.00	\$ 79,500
Mitigation of Hydrocarbon contaminated soil (Offsite disposal)	1	LS	\$124,550	\$ 124,550
Mitigation of Aerial Deposited Lead (ADL) contaminated soil (Offsite disposal)	1	LS	\$2,192,716.00	\$ 2,192,716
Imported fill to replace exported soil (6,100 cubic meters)	1	LS	\$219,950.00	\$ 219,950
			<u>Sub Total</u>	<u>\$ 2,616,716</u>
Wetland Mitigation	1			
Riparain/Wetlands Mitigation & Monitoring	1	LS	\$500,000.00	\$ 500,000
Sensitive Secies Construction Monitoring	1	LS	\$16,430.00	\$ 16,430
			<u>Sub Total</u>	<u>\$ 516,430</u>
Total For Expanded Project Alternative:			\$	3,133,146

Estimate Prepared by: <u>Paul Jones</u>	Phone: <u>707-443-8326</u>	Date: <u>12/17/01</u>
<u>Misha Shwarz</u>	Phone: <u>707-443-8326</u>	Date: <u>12/17/01</u>
Estimate Checked by: <u>John Komaru</u>	Phone: <u>415-243-4639</u>	Date: <u>12/17/01</u>

ATTACHMENT E

STRUCTURAL MODIFICATIONS

Route 101 Widening from Old Redwood Highway in Petaluma north to Rohnert Park Expressway in Sonoma County
Summary of Structure Modifications
04-219-0A180K

Structure	Bridge Number	Type	Widening	Factors	Minimum Alternative	Expanded Alternative
Route 101/116 Separation	20-169 R/L	Reinforced concrete "T" girder and reinforced concrete column bents.	Precast pre-stressed "T" girder and reinforced concrete column bents.	Precast elements, additional substructure, pile foundations.	512 sq. meters \$925,000	512 sq. meters \$925,000
Sierra Avenue Undercrossing	20-167 R/L	Reinforced concrete "T" girders and reinforced concrete column bents.	Reinforced concrete "T" girders and reinforced concrete column bents.	Sliver widening, additional substructure, pile foundations, staged construction.	424 sq. meters \$975,000	424 sq. meters \$975,000
Railroad Avenue Undercrossing	20-166 R/L	Reinforced concrete "T" girders and reinforced concrete column bents.	Reinforced concrete "T" girders and reinforced concrete column bents.	Sliver widening, additional substructure, pile foundations, staged construction.	603 sq. meters \$1,300,000	603 sq. meters \$1,300,000
Copeland Creek Bridge	20-15 R/L	Reinforced concrete slab superstructure, pier wall and cantilever abutments.	Reinforced concrete slab superstructure, pier wall and cantilever abutments.	Lengthening of box culvert, cantilever abutments.	114 sq. meters \$175,000	185 sq. meters \$300,000
Laguna De Santa Rosa Bridge	20-16 R/L	Reinforced concrete slab superstructure over a concrete box culvert.	Reinforced concrete slab superstructure, diaphragm abutments and piles.	Lengthening of box culvert, pile foundations.	48 sq. meters \$85,000	110 sq. meters \$200,000
Willow Brook Creek Bridge	20-0161 R/L	Reinforced concrete slab superstructure assumed.	Reinforced concrete slab superstructure, diaphragm abutments and piles.	Unknown.	130 sq. meters \$240,000	130 sq. meters \$240,000
Cattle Undercrossing (KP 20.1)	Not available	Reinforced concrete slab superstructure assumed.	Reinforced concrete slab superstructure, diaphragm abutments and piles.	Unknown.	60 sq. meters \$105,000	60 sq. meters \$105,000

Prepared by: John Sprinkle Phone: 415-283-4970 Date: 12-17-01

Reviewed by: John Komaru Phone: 415-243-4639 Date: 12-07-01

ATTACHMENT F

DESIGN SCOPING CHECKLIST



PSR(PDS) Design Scoping Checklist

Project Information

District 04 County SON Route 101 Kilometer Post (Post Mile) 12.1(7.5) to 22.4(13.9)
EA 04-219-0A180K

Description

The Minimum Project Alternative includes the following elements within the project limits:

- Widening within the existing median area for two new 3.6-meter-wide HOV lanes, one northbound and one southbound;
- Widening of inside and outside shoulder widths to meet the current design standard of 3.0 meters;
- Widening of two undercrossing pairs, one bridge pair, a separation, various culverts, and a cattle undercrossing to accommodate mainline widening;
- Realignment of two on-ramps to meet current design standards;
- Ramp metering facilities at all nine existing on-ramps within the project limits;
- Widening of seven on-ramps for HOV preferential lanes (the northbound and southbound loop on-ramps at Old Redwood Highway in Petaluma will not be widened); and
- A 3.6-meter wide northbound climbing lane along the 4.6-kilometer Cotati Grade.

The Expanded Project Alternative proposes the following components:

- All proposed facilities as described in the Minimum Project Alternative;
- A 3.6-meter wide auxiliary lane in each direction (northbound and southbound) between Route 116 West (KP 20.7) and Rohnert Park Expressway (KP 22.0); and
- Two new on-ramps and one new off-ramp at Railroad Avenue, which, along with the existing off-ramp to Railroad Avenue, will form a standard diamond interchange.

Project Manager Nino Cerruti Phone # (510) 286-5129

Project Engineer John Komaru Phone # (415) 243-4639

Design Functional Manager Saaid Fakharzadeh Phone # (510) 286-6011

- Project Development Coordinator Mike Thomas Phone # (510) 286-4687

Project Screening

Please see Attachment C of the PSR(PDS) for layouts showing the location of the proposed improvements.

1. Project Description as Noted in Regional Transportation Plan: “Widen US 101 (adding HOV lanes in each direction) from Old Redwood Highway in Petaluma north to Rohnert Park Expressway.”

This description is in the Draft 2001 Regional Transportation Plan (RTP), released by the Metropolitan Transportation Commission (MTC) on August 10, 2001. The project’s RTP reference number is 21904 and the project is to be completed by the year 2010 for federal air quality purposes.

2. Project Setting 4-Lane Mainline Son-101 Freeway

Rural or Urban Urban and Semi Rural

Current land uses Highway

Adjacent land uses Commercial, Industrial, Residential, Open Space, Agricultural
(industrial, light industry, commercial, agricultural, residential, etc.)

Existing landscaping/planting Highway landscaping

3. Route Adoption: Date 1926 Type of Facility (Freeway, Controlled Access Highway, or Conventional Highway) Conventional highway upgraded to freeway

Freeway Agreement: Date: The segment within the project limits was included in the highway system in 1909 and the widening to expressway started in 1947.

The Freeway Agreement for Route 101 in Sonoma County was revised on July 10, 1996 at the request of the City of Windsor to improve Arata Lane interchange (2 southbound ramps and 2 northbound off-ramps). The County requested a revision, which was approved on October 10, 1996 to construct ramps at PM 30.7 – 31.9.

Description of the Transportation Problem

The most pressing transportation problem to be addressed by the proposed project is the need for a continuous HOV lane system along the Route 101 corridor through Marin and Sonoma Counties. A continuous HOV lane system will help promote the use of carpools and buses for long-distance commutes and enhance the efficiency of the transportation system, thereby saving time and resources. Ramp metering facilities are expected to further enhance operations on the freeway mainline, and preferential HOV bypass lanes at the ramp meter locations will further enhance benefits for HOV commuters. This project will complete one piece of the HOV lane corridor, preventing gaps in the system and optimizing benefits for HOV commuters. As described in the traffic scoping checklist and the narrative discussion of operations provided in Attachment G of the PSR(PDS), increasing traffic demands and congestion along this corridor call for the widening of this transportation facility. The problem of rear-end collisions (discussed in the PSR(PDS))

may be addressed if the congestion within the project limits is reduced. In addition, driver expectancy problems have surfaced at two atypical on-ramps within the project limits; realignment of the on-ramps to a standard configuration and design would also benefit operations. Finally, slow-moving trucks traveling northbound along the Cotati grade would benefit from a climbing lane on this section of Route 101.

Proposed Scope of Work

The major components of the two build alternatives are provided in the project description section of this checklist. In addition, for both alternatives, the scope of potential soundwalls and traffic operations systems (TOS) elements, along with a Transportation Management Plan (TMP) will be determined in later phases of the project. Design exceptions are anticipated for both build alternatives, as listed below. The headquarters geometric design reviewer has provided conceptual concurrence for these anticipated design exceptions. Official fact sheets for the exceptions will need to be drafted and approved in the next phase of the project. The anticipated design exceptions are:

- HOV preferential lanes will not be provided at the loop on-ramps from southbound Old Redwood Highway to southbound Route 101 and from northbound Old Redwood Highway to northbound Route 101, due to low forecasted traffic volumes on these on-ramps and the need to replace a structure to provide the extra lanes
- The standard vertical clearance of 5.1 meters will not be provided under the Denman Road Overcrossing (Old Redwood Highway). The existing vertical clearance is below 4.6 meters. A minimum of 4.6 meters will be provided for increased safety and highway operations.
- The standard vertical clearance of 5.1 meters on Route 116 West will not be provided under Route 101. The existing vertical clearance of 4.5 meters will be improved to provide a minimum of 4.6 meters for increased safety and highway operations.

Design Criteria

Type of facility to be considered? (more than one may apply)

Freeway Expressway Conventional Highway Urban Street

Other (specify) _____

Design Speed for highway facilities within the project limit? 110 km/hr

Design Period: Construction Year is? Begin 2008, End 2010 Design Year is? 2030

Design Capacity: Level of Service to be maintained over the design period is?

Mainline _____ Ramp _____ Local Street _____ Weaving Sections _____

Level of Service will be determined in the PA/ED phase.

Design Vehicle Selection?

STAA X California _____ Bus _____

Proposed Roadbed and Structure Widths

Forecasted Average Daily Traffic Volumes: peak hourly traffic volumes to increase by 40% AM Southbound and 49% PM Northbound between years 2001 and 2030.

Percent Truck Volume 10 %

	Roadbed Width			Structure Width		
	Existing	Proposed	Standard	Existing	Proposed	Standard
State highway						
Lane Widths	<u>3.6</u>	<u>3.6</u>	<u>3.6</u>	<u>3.6</u>	<u>3.6</u>	<u>3.6</u>
Left Shoulder	<u>1.2</u>	<u>3.0</u>	<u>3.0</u>	<u>3.0</u>	<u>3.0</u>	<u>3.0</u>
Right Shoulder	<u>2.4-3.0</u>	<u>3.0</u>	<u>3.0</u>	<u>3.0</u>	<u>3.0(1.2)*</u>	<u>3.0</u>
Median Width	<u>varies</u>	<u>6.6</u>	<u>6.6</u>	<u>12.2</u>	<u>6.6</u>	<u>6.6</u>
Bicycle Lane	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
Local Street (not applicable)						
Lane Widths	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Left Shoulder	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Right Shoulder	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Median Width	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Bicycle Lane	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

* At the Old Redwood Highway loop on-ramps, the right shoulders are proposed at 1.2 meters. A fact sheet exception will be obtained during a later phase of project, if needed.

Median Barrier Existing unpaved with a double thrie beam barrier

Proposed (Concrete Barrier / Thrie Beam / Other) Type 60 concrete barrier, with double thrie beam barrier in flood plain areas.

Roadway Design Scoping

Mainline Operations

Mainline Highway Widening

Existing pavement to be rehabilitated with Asphalt Concrete

Widen existing 4 lane facility to 7* lanes. R/W acquisition 7* lanes.

Local street structures to span n/a lanes of highway (for future requirements).

- * A northbound climbing lane is proposed adjacent to the Cotati Grade. Approximate length is 4.5 kilometers.

Upgrade existing facility to:

- | | |
|---|---|
| <input type="checkbox"/> Expressway Standards | <input checked="" type="checkbox"/> Freeway Standards |
| <input type="checkbox"/> Controlled Access Highway | <input type="checkbox"/> Traversable Highway |
| <input type="checkbox"/> Improve Vertical Clearance | <input type="checkbox"/> Adequate Falsework Clearance |

Ramp / Street Intersection Improvements

- | | |
|---|--|
| <input type="checkbox"/> New Signals | <input type="checkbox"/> Modify Signals |
| <input type="checkbox"/> Right Turn Lanes | <input type="checkbox"/> Widening For Localized Through Lanes |
| <input checked="" type="checkbox"/> Merging Lanes | <input checked="" type="checkbox"/> Deceleration / Acceleration Lanes |
| <input type="checkbox"/> Left Turn Lanes | <input type="checkbox"/> > 300 VPH Left Turn (Requires Double Left Turn) |
| <input type="checkbox"/> Interchange Spacing | <input checked="" type="checkbox"/> Ramps Intersect Local Street < 4 % Grade |
| <input type="checkbox"/> Intersection Spacing | <input type="checkbox"/> Exit Ramps > 1,500 VPH Designed As Two Lane Exit |
| <input type="checkbox"/> Single Lane Ramps Exceeding 300 M Widened To Two Lanes | |
| <input checked="" type="checkbox"/> Other <u>Single Lane Ramps Widened to Two Lanes But Tapering To One Lane at Mainline. Three new ramps proposed for Railroad Avenue.</u> | |

Operational Improvements

Climbing Lane

- ☒ Sustained Grade Exceeding 2% And Total Rise Exceeds 15 M.

☐ Other _____

Auxiliary Lanes

- ☐ When 600 M Between Successive On-Ramps.
- ☐ Two Lane Exit Ramps Have 400 M Auxiliary Lane.
- ☐ Weaving < 500 M between Off-Ramp and On-Ramp.
- ☒ Other Weaving < 1,300 M between Off-Ramp and On-Ramp

Right of Way Access Control

- ☒ Existing access control extends at least 15 m beyond end of curb return, radius or taper.

☐ New construction access control extends at least 30 m (urban areas) or 100 m (rural areas) beyond end of curb returns, radius or taper.

☐ Other _____

Highway Planting

☒ Replacement

☐ Median

☒ Mitigation

Safety

☐ Off-Freeway Access

☒ Maintenance Vehicle Pull-Out

Roadside Management

☒ Slope paving

☐ Gore paving

☐ Roadside paving

Stormwater

☒ Erosion control

☒ Drainage

☒ Slope design

Structures

☐ New Bridge

☐ Bridge Rehab

☒ Retaining Wall

☒ Other Sound Wall

☒ On STRAIN list for Bridge Widening

Additional Studies

- Construction Schedule and Management for restrictions during wet season for southern end of project in flood plain area.

Preliminary Evaluation provided by:

Project Engineer John D. Komar Date 12/17/01
John Komaru

Design Manager Saa'id Fakharzadeh Date 12/19/01
Saa'id Fakharzadeh

Design Concept approved by: Gordon Brown Date 12/18/01
Gordon Brown

Project Development Coordinator Gordon Brown for Date 12/19/01
Michael W. Thomas

Conceptual approval in no way implies that any non-standard features currently identified or identified in the future will be approved. Non-standard features will need to be identified, fully analyzed and justified prior to approval (via a design exception fact sheet) of the selected alternative.

Reviewed by:

Project Manager Nino Cerruti Date 12-20-01
Nino Cerruti

ATTACHMENT G

TRAFFIC SCOPING CHECKLIST



PSR(PDS) Traffic Forecasting, Analysis and Operations Scoping Checklist

Project Information

District 04 County SON Route 101 Kilometer Post (Post Mile) 12.1(7.5) to 22.4 (13.9)
EA 04-219-0A180K

Description

The Minimum Project Alternative includes the following elements within the project limits:

- Widening within the existing median area for two new 3.6-meter-wide HOV lanes, one northbound and one southbound;
- Widening of inside and outside shoulder widths to meet the current design standard of 3.0 meters;
- Widening of two undercrossing pairs, one bridge pair, a separation, various culverts, and a cattle undercrossing to accommodate mainline widening;
- Realignment of two on-ramps to meet current design standards;
- Ramp metering facilities at all nine existing on-ramps within the project limits;
- Widening of seven on-ramps for HOV preferential lanes (the northbound and southbound loop on-ramps at Old Redwood Highway in Petaluma will not be widened); and
- A 3.6-meter wide northbound climbing lane along the 4.6-kilometer Cotati Grade.

The Expanded Project Alternative proposes the following components:

- All proposed facilities as described in the Minimum Project Alternative;
- A 3.6-meter wide auxiliary lane in each direction (northbound and southbound) between Route 116 West (KP 20.7) and Rohnert Park Expressway (KP 22.0); and
- Two new on-ramps and one new off-ramp at Railroad Avenue, which, along with the existing off-ramp to Railroad Avenue, will form a standard diamond interchange.

Project Manager Nino Cerruti Phone # (510) 286-5129

Project Engineer Cristina Ferraz Phone # (510) 286-3890

Traffic Forecasting Functional Manager Richard Fahey Phone # (510) 286-5761

Traffic Operations Functional Manager Michael Church Phone # (510) 286-4642

Traffic Forecasting, Traffic Analysis Scoping

Traffic volumes used for the analysis were based on Department traffic census count data collected for the project area. For this study, the travel demand forecasts and HOV usage will be taken from approved or current traffic operations analysis studies within the corridor. These studies include the approved PSR/PDS document for the Route 101 from Route 116 East to Old Redwood Highway (EA 04-219-28112K) and the detailed traffic operations study for Route 101 (EA: 129650, 245400, and 263900). These other studies are located directly north (EA: 129650, 245400, and 263900) and south (EA 04-219-28112K) of this project and are assumed to be appropriate for this stage of project development. Since the Route 101 corridor in the project vicinity is rural, it is assumed that significant variations in overall travel demand characteristics in the corridor would not occur. These assumptions and approach have been coordinated with Department Transportation Planning units and a general consensus was reached that utilizing these growth rates would be suitable for the PSR/PDS level of traffic operations assessment.¹ The annual travel demand growth rates for the segment of Route 101 (between Old Redwood Highway and Rohnert Park Expressway-KP 12.1/22.4) are based on information documented in the approved PSR/PDS for Route 101-between Route 116 East and Old Redwood Highway-KP 6.1/12.1 (August 3, 2001).

The PSR(PDS) document (EA 04-219-28112K) used a peak hour growth rate of approximately 39 percent for the southbound direction (AM) and 47 percent for the northbound direction (PM) between the period of 2000 and 2028. This is equivalent to an annual growth rate of 1.39 percent and 1.68 percent for the southbound (AM) and northbound (PM) direction, respectively. The peak hour growth rates used² were estimated from the 2020 MTC travel demand model and 2030 Sonoma County travel demand model data. Data for the 2030 Sonoma County travel demand model were extracted from the Marin County travel demand model.

HOV volume projections follow those determined in the traffic operations analysis report (EA: 129650, 245400, 263900, June 2001) for segments on Route 101 between Rohnert Park Expressway and the Santa Rosa Avenue interchanges, and between Route 12 and Bicentennial Way interchanges. These segments are located just north of the project section. The HOV volume projections, in percentages, are:

- No Build Scenario (year 2010 and 2030)
14.5 percent of total volume – from Wilfred Avenue to Route 12
- Build HOV 2+ (occupancy of 2 or more persons) Scenarios
17.4 percent of total volume (year 2010) – from Wilfred Avenue to Steele Lane
19.0 percent of total volume (year 2030) – from Wilfred Avenue to Steele Lane

¹ Meeting with Dick Fahey and Thanh Tu, Caltrans Transportation Planning, at Caltrans, District 4, Oakland, CA.; October 10, 2001.

² PSR/PDS for Route 101-between Route 116 East and Old Redwood Highway-KP 6.1/12.1 or PM 3.8/7.5 (August 3, 2001).

The report states that these HOV ratios are applicable to “the entire corridor (including ramps) where HOV lanes exist or will be built”³. Discussions were also conducted with Caltrans Highway Operations to regarding the application of these HOV volume projections (percentage allocation out of total traffic volumes) to the project segment, and it was agreed that this is reasonably applicable⁴. The HOV usage or volume projections were derived and adjusted using QuickHOV (FHWA, Report # FHWA-SA-96-073). These HOV usage and volume (percentages) are assumed to be appropriate for this phase of the project planning development.

Although the above forecasting methodology and assumptions are accepted for this phase of project development, in the next phase (PA/ED) it will be necessary to generate corridor and project specific travel demand forecasts from a validated countywide model or combination of forecasting tools as approved by all reviewing agencies (i.e. the Marin-Sonoma Countywide Model, MTC projections, etc.). The project specific travel demand forecasts should include the latest and approved land use projections within the corridor including the recently adopted City of Rohnert Park General Plan update.

Traffic Operations Scoping

See attached Memo for *Operational Analysis for SON 101 HOV Lane PSR (PDS) Projects*, prepared by State of California, Department of Transportation, District 4, Office of Highway Operations, October 30, 2001.

Project Screening

1. Project Features: New R/W? Some Excavation or fill Yes
2. Project Setting Existing 4 lane mainline freeway
Rural or Urban Urban and Semi Rural
Current land uses Commercial, Residential, Agricultural
Adjacent land uses Commercial, Industrial, Residential, Open Space, Agricultural
(industrial, light industry, commercial, agricultural, residential, etc.)

³ Traffic Operations Analysis Report: Son-101 Widening, EA 129659, 245400, 263900 (June, 2001).

⁴ Meeting with Paul Ma, Caltrans Highway Operations, at Caltrans District 4, Oakland CA; October 10, 2001.

Existing Traffic Operational Conditions and Warrants Supporting the Need for the Improvement

Current traffic circulation patterns indicate that the peak period traffic demand is directional. During the morning peak hour the peak direction is southbound whereas during the evening peak hour the peak direction is northbound. Recent trends also indicate traffic demand increasing in the off-peak direction but the existing traffic demand is still directional. Traffic congestion during the A.M. peak is usually encountered at several locations. Proceeding from north to south, the following traffic bottlenecks occur:

- North of Santa Rosa, at the River Road interchange southbound on-ramp merge. In 2000, this bottleneck backed-up traffic as far as the Shiloh Road Interchange. Traffic congestion occurred for about two hours, with individual vehicle delays of as much as seven minutes.
- In the vicinity of the Pepper Road on-ramp (north of Petaluma). This minor traffic bottleneck causes some traffic congestion, with as much as two minutes of delay to southbound freeway traffic in 2000. This bottleneck appears to be caused by slow trucks entering the freeway at Pepper Road.
- Southbound Route 101 at the beginning of the "Marin - Sonoma Narrows" Expressway downstream of the South Petaluma Boulevard interchange. Congestion monitoring studies performed in 2000 indicate that this bottleneck backed-up traffic on southbound Route 101 to about midway between the east Washington Street and Old Redwood Highway (Penngrove) Interchanges. Southbound Route 101 experienced approximately three hours of traffic congestion, with maximum individual vehicle delays of about eighteen minutes.

At present, traffic on northbound Route 101 is constrained by the capacity of the four-lane expressway known as the "Marin-Sonoma Narrows." This traffic bottleneck has a capacity of about 3,600 vehicles per hour, lower than the estimated capacity of the Route 101 freeway in Petaluma (about 4,000 – 4,200 vehicles per hour). Northbound Route 101 traffic is backed-up in Novato, Marin County during the P.M. peak period because of this constraint. Recent congestion monitoring studies (April and November 2000) on northbound Route 101 in Petaluma show an intermittent traffic problem at the Penngrove (Old Redwood Highway) interchange. This appears to be due to slow trucks entering and exiting the freeway at Penngrove. These slow trucks briefly back-up traffic in the outside lane until they are able to accelerate to freeway speeds or exit the freeway. It also appears that the up-hill grade, approximately 0.6 kilometers (one mile) downstream, causes some slowing of large trucks and/or prevents them from reaching freeway speeds.

Recently developed traffic projections show that peak hour traffic is anticipated to increase by about 40 percent on southbound Route 101 in the 'southern project area,' and by about 49 percent on northbound Route 101 in the same area, between 2001 and 2030².

² Traffic Forecasts for Route 101 Widening from Old Redwood Highway to Rohnert Park Expressway in Sonoma County. Prepared by Parsons Brinckerhoff; October 11, 2001.

These projections also show that HOV usage will increase from about 14.5 percent of total traffic to 19 percent of total traffic if the proposed HOV lanes are provided.

Projected traffic growth will worsen the existing traffic bottlenecks (discussed above) and may cause additional traffic bottlenecks to develop. In general, the existing roadway system cannot accommodate the projected increases in traffic volumes, which will increase the length of existing traffic queues. The extent and duration of traffic congestion will substantially increase, and vehicle delays will be much longer than those that occur presently.

The proposed widening projects on Route 101 in Sonoma County will partially mitigate anticipated future traffic congestion, but will not eliminate it. The primary purpose of these widening projects is to provide HOV lanes in both directions on Route 101 to enable high-occupancy vehicles to bypass traffic congestion in the "mixed-flow" lanes. These HOV lanes have two benefits: (a) they enable the roadway to handle more vehicles by supplying new lane-kilometers or lane-miles, and (b) they encourage the use of carpools and buses, with the goal of serving a higher number of person-trips than traditional mixed-flow lanes.

Ramp intersection Yes

Merge / diverge Yes

Street intersection Not applicable

Weaving / merging (spacing) Not applicable

Other
Climbing lane needed along Cotati Grade

Traffic Study and Analysis Anticipated

Traffic Modeling Assumptions

- ☐ Use Local Model
 - ☐ Update New Model
 - ☐ New Model
- ☒ Existing Traffic Counts
 - ☐ New Traffic Counts
 - ☐ Historical Growth
- ☒ General Plan (GP) Build-out
 - ☐ Pro-Rate GP Growth
- ☒ Existing Year (2001)
 - ☒ Design Year (2030)
 - ☐ Interim Year ()

Traffic Analysis

- ☒ Mainline LOS
 - ☐ Merge/Diverge LOS
 - ☐ Ramp Int. LOS
- ☐ Adjacent IC LOS
 - ☐ Ramp Metering (open)
 - ☒ Ramp Metering (later)
- ☐ Left/Right Turn Storage
 - ☐ Accident / Safety Analysis
 - ☐ Intersection Queues
- ☐ Construction Staging
 - ☐ Project Staging

References: Guide for the Preparation of Traffic Impact Studies, Caltrans January 2001;
Highway Capacity Manual: Transportation Research Board.

Traffic Operations Scoping

Traffic Operational Improvements

Please see the layout sheets in Attachment C of the PSR(PDS) for the locations of anticipated traffic operational improvements.

- ☒ Auxiliary Lanes
 - ☒ Intersection Improvements
 - ☒ Truck Climbing Lane

- ☐ New Signals
 - ☐ Modify Signals
 - ☐ Merging Improvements
- ☒ Weaving Improvements
 - ☒ Deceleration / Acceleration Lanes

Other

There is an addition of two southbound ramps (on- and off-ramps) and one northbound on-ramp at the interchange of Route 101 and Railroad Avenue. The northbound on-ramp at interchange of Route 101/Route 116 will be realigned. There will be a new bridge structure at interchange of Route 101/Old Redwood Highway.

Traffic Management Systems


Attach the project location map to this checklist to show location of all traffic management systems identified.

- ☒ Ramp Meters
 - ☒ HOV Ramp Bypass
 - ☒ Mainline HOV Lanes
- ☒ Detector Loops
 - ☒ Communication Networks (fiber optic, telephone, etc.)
- ☒ Closed Circuit Television
 - ☒ Changeable Message Sign
 - ☒ Highway Advisory Radio

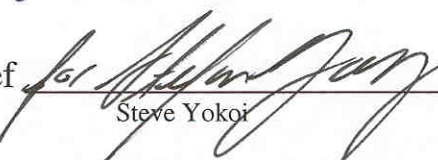
Discuss strategies (technical analysis, public outreach, etc.) to secure local agency and public support to implement HOV lanes and ramp metering:

Ramp metering equipment and facilities (loop detectors, conduit, foundations, CHP (California Highway Patrol) enforcement areas, etc.) will be installed according to the most recent Caltrans' Ramp Meter Design Guidelines, but will not be activated with this project. To be thoroughly effective, ramp metering must be implemented on a corridor-wide basis. Without a corridor or system-wide approach, its implementation may impact the surrounding street network especially at the on-ramp intersections with local streets. The ramp metering facilities should not be implemented or activated until detailed operations studies have determined the potential impacts and mitigations for those potential impacts that are in place. No extensive forms of public outreach were carried out for this stage of the PSR/PDS study.

Preliminary Traffic Forecasting Evaluation provided by:

Traffic Forecasting  Date 12/17/01
John Komaru

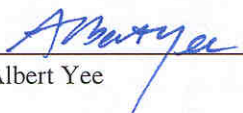
Reviewed by:

Traffic Forecasting Chief  Date 12/18/01
Steve Yokoi

Preliminary Traffic Operations Evaluation provided by:

Traffic Operation Engineer  Date 12/20/01
Michael Church

Reviewed by:

Traffic Operations Chief  Date 12/20/01
Albert Yee

Memorandum

To: **CRISTINA FERRAZ**
District Branch Chief,
PSR I Branch

Date: October 30, 2001
File: EA 0A180K
03-SON-101
KP 12.1/22.4 (PM 7.5/13.9)

REY CENTENO
District Branch Chief,
PSR III Branch

EA 0A100K
04-SON-101
KP 34.9/47.5 (PM 21.7/29.5)

From: **DEPARTMENT OF TRANSPORTATION**
4 - Highway Operations Branch

Subject: Operational Analysis for SON 101 HOV Lane PSR (PDS) Projects

PSRs are being prepared for two projects on Route 101 in Sonoma County. These projects propose to provide HOV lanes in both directions between:

- a) The Old Redwood Highway (Pengrove) interchange in Petaluma and the Rohnert Park expressway interchange in Rohnert Park, and
- b) The Steele Lane interchange in Santa Rosa and the Windsor River Road interchange in Windsor.

These projects, plus other projects either under study or under construction, will provide continuous HOV lanes in both directions on Route 101 from central Marin County to the City of Windsor. The Office of Highway Operations has been asked to prepare "Narrative Operational Descriptions" for these two projects, and has also been asked to consider (as an alternative) the impacts of auxiliary lanes from Steele Lane to Airport Blvd. (E-mail from Saed Hasan to Michael Church).

The Office of Highway Operations has completed a preliminary operational analysis of these proposed projects, based on three sets of projected peak hour traffic volumes. The study area for this analysis extends from Old Redwood Highway in Petaluma to Windsor River Road in Windsor. Please note that the results of this study should be considered to be ONLY ROUGH ESTIMATES, due to the limited time provided for the operational analysis, and due to the necessary use of traffic projections obtained from three different sources (listed in the attached operational report). These traffic projections do not agree with each other, and some projected peak hour traffic volumes at the "match" points of these three documents are substantially different. Therefore, it is vital that any conclusions made in this operational report be verified during the Project Report/ Environmental Document phase before any final decisions are made. A brief summary of the attached operational report is as follows:

Ms. Cristina Ferraz
Mr. Rey Centeno
October 29, 2001
Page 2

Existing traffic congestion on Route 101 in Sonoma County will substantially worsen in the future, if traffic growth occurs as projected. Traffic projections show that peak hour traffic is anticipated to increase by about forty to fifty percent in 2030, between the Old Redwood Highway (Pengrove) interchange in Petaluma and the Rohnert Park Expressway interchange in Rohnert Park, and by between thirty and one hundred percent in 2029 between the Steele Lane interchange in Santa Rosa and the Windsor River Road interchange in Windsor. Inasmuch as various parts of Sonoma 101 are already operating at capacity, this additional traffic will all be caught in growing traffic queues.

The proposed HOV lane projects, plus other projects under way will result in the establishment of a continuous HOV lane in each direction, will increase system capacity on Route 101 in Sonoma County, and will partially mitigate anticipated traffic congestion. However, even with the proposed improvements, traffic congestion will still occur on Route 101 in Sonoma County. On southbound Route 101 traffic bottlenecks will occur north of Petaluma and north of Rohnert Park, causing heavy traffic backups. The proposed southbound HOV lane will allow high-occupancy vehicles to bypass this congestion, saving these vehicles several minutes of travel time. On northbound route 101, traffic bottlenecks will occur in north Petaluma and north of Santa Rosa. The proposed HOV lanes will allow high-occupancy traffic to bypass traffic congestion in Petaluma and Santa Rosa, and will provide needed capacity for constrained traffic volumes between Petaluma and Santa Rosa.

The attached Highway Operational Report discusses the results of our operational study in more detail. If you have any questions concerning this memo or the attached report, please call either Mike Church at 286-4642 (Calnet 541-4642) or Mike Kerns at 622-5430 (Calnet 542-5430).

Michael W. Church
Senior Transportation Engineer,
Office of Highway Operations

Attach: 1

cc: AY/MEK, MWC, S.Wong (Adv. Plan.), N.Cerruti (Design, Contra Costa), R.Donovan (Adv. Plan.), S.Hasan (Adv. Plan.), Hwy Ops File.

HIGHWAY OPERATIONAL REPORT

Analysis of Proposed High-Occupancy Vehicle (HOV) Lanes in Both Directions on Route 101 in Sonoma County, Between; (a) Old Redwood Highway (Pengrove) and Rohnert Park Expressway interchanges and (b) between the Steele Lane and Windsor River Road interchanges.

PSRs are being prepared for two projects on Route 101 in Sonoma County. These projects propose to provide an HOV lane in both directions between:

- a) The Old Redwood Highway (Pengrove) interchange in Petaluma and the Rohnert Park expressway interchange in Rohnert Park, and
- b) The Steele Lane interchange in Santa Rosa and the Windsor River Road interchange in Windsor.
- c) The Office of Highway Operations has also been requested to consider auxiliary lanes from Steele Lane to Airport blvd. (E-mail from Saed Hasan to Michael Church). This alternative will be briefly discussed in this report.

These projects, plus other projects either under study or under construction, will provide continuous HOV lanes in both directions on Route 101 from central Marin County to the City of Windsor. The Office of Highway Operations has made a preliminary operational analysis of these proposed projects, based on three sets of projected peak hour traffic volumes. The study area for this analysis extends from Old Redwood Highway in Petaluma to Windsor River Road in Windsor.

Please note that the results of this study should be considered to be ONLY ROUGH ESTIMATES, due to the limited time provided for the operational analysis, and due to the necessary use of traffic projections obtained from three different sources (listed below). These traffic projections do not agree with each other, and some projected peak hour traffic volumes at the "match" points of these three documents are substantially different. Therefore, it is vital that any conclusions made in this operational report be verified during the Project Report/ Environmental Document phase before any final decisions are made.

Our analysis is based on the following data and assumptions:

- 1. Three sets of traffic projections;
 - a) Year 2030 A.M. (southbound only) and P.M. (northbound only) traffic projections for the proposed widening of Route 101 between Petaluma and Rohnert Park; prepared by "PB," and forwarded to Caltrans by E-mail on October 16, 2001.
 - b) Year 2030 A.M. and P.M. peak hour traffic volumes prepared by Caltrans; Division of Operations for the "SON-101 Widening Project."

- c) Year 2029 A.M. and P.M. peak hour traffic projections prepared by Caltrans, Division of Planning for the proposed widening of Route 101 north of Route 12.
- 2. Figure 3.3; "Queue Discharge and Congested Flow;" Highway Capacity Manual, Third edition (1997).
- 3. It is assumed that proposed widening projects in the "Marin - Sonoma " (from Novato to Petaluma), in Petaluma, and from Wilfred Avenue to Steele Lane have been completed.
- 4. No geometrics have been provided for this operational analysis, so the following geometric assumptions have been made:
 - (a) The two proposed projects are basically the addition of HOV lanes to complete and extend the continuous HOV facility on northbound and southbound Route 101, from central Marin County to Windsor in Sonoma County.
 - (b) A climbing lane will be built on northbound Route 101 in the "Petaluma-Cotati Grade," which begins about a mile north of the Old Redwood Highway interchange in Petaluma.
 - (c) All on-ramps have HOV bypass lanes.
 - (d) The geometrics shown in the "SON - 101 Widening Project" operational report (June 2001) are assumed to be either in place or part of one of the two proposed projects.

I. EXISTING TRAFFIC OPERATIONS

Caltrans inventories existing traffic conditions on State Freeways twice a year, using tachometer-equipped vehicles to record speeds, times, and locations. This data is used to prepare annual Highway Congestion reports that are available to the public. The following discussion of existing traffic conditions is based on the congestion monitoring studies made in 2000, with additions based on new traffic problems that may have been noted in the raw data sheets obtained from the Spring 2001 traffic studies.

A. A. M. Peak Period; Southbound Route 101

A vehicle travelling southbound on Route 101 during the A.M. peak period would encounter traffic congestion at several locations. Proceeding from north to south, the following traffic bottlenecks occur:

1. The first traffic bottleneck occurs north of Santa Rosa, at the River Road interchange southbound on-ramp merge. In 2000, this bottleneck backed-up traffic to as far as the Shiloh Road interchange. Traffic congestion occurred for about two hours, with individual vehicle delays of as much as seven minutes.
2. A second traffic bottleneck occurs between the Route 12 and Baker Avenue interchanges, or between the Baker Avenue and Hearn Avenue interchanges in the City of Santa Rosa. In 2000, this bottleneck backed-up traffic to the vicinity of Third Street. Traffic congestion occurred for more than three hours, with individual vehicle delays as high as six or seven minutes.
3. A minor traffic bottleneck in the vicinity of the Pepper Rd. on-ramp (north of Petaluma) causes some traffic congestion; with as much as two minutes of delay to southbound freeway traffic in 2000. This bottleneck appears to be caused by slow trucks entering the freeway at Pepper Rd.
4. Another traffic bottleneck occurs on southbound Route 101 at the beginning of the "Marin - Sonoma Narrows" expressway downstream of the South Petaluma Boulevard interchange. Congestion monitoring studies made in 2000 indicate that this bottleneck backed-up traffic on southbound Route 101 to about midway between the east Washington Street and Old Redwood Highway (Pengrove) interchanges. Southbound Route 101 experienced about three hours of traffic congestion, with maximum individual vehicle delays of about eighteen minutes.

B. A. M. Peak Period; Northbound Route 101

At present, northbound Route 101 traffic at the south end of Sonoma County does not experience traffic congestion. However, further north, in Santa Rosa, there is a significant traffic bottleneck on northbound Route 101 between the Baker Avenue and Route 12 interchanges, and between the College Avenue and Steele Lane interchanges. In 2000 these bottlenecks backed-up traffic to the vicinity of the Santa Rosa Avenue interchange. Traffic congestion lasted for more than two hours, with individual vehicle delays of as much as ten to eleven minutes.

C. P. M. Peak Period; Southbound Route 101

During the P.M. peak period traffic on southbound Route 101 is heavily congested in the City of Santa Rosa. The primary bottleneck appears to be between the College Avenue and Route 12 interchanges, or between the Route 12 and Baker Avenue interchanges (both of these locations will be the primary bottleneck at different times during the peak period). In 2000 these bottlenecks backed-up traffic to the vicinity of the Hopper Avenue interchange. They caused about four hours of traffic congestion. Individual vehicle delays were as much as about eleven minutes.

D. P. M. Peak Period; Northbound Route 101

At present, traffic on northbound Route 101 is constrained by the capacity of the four-lane expressway known as the "Marin - Sonoma Narrows." This traffic bottleneck has a capacity of about 3600 vehicles per hour, lower than the estimated capacity of the Route 101 freeway in Petaluma (about 4000 - 4200 vehicles per hour).

Northbound Route 101 traffic is backed-up in Novato, Marin County during the P.M. peak period because of this constraint. However, there are two bottleneck locations on northbound Route 101 in Sonoma County during the P.M. peak period. Travelling from south to north, they are:

1. Recent congestion monitoring studies (April and November, 2000) on northbound Route 101 in Petaluma show an intermittent traffic problem at the Pengrove (Old Redwood Highway) interchange. This appears to be due to slow trucks entering and exiting the freeway at Pengrove. These slow trucks briefly back-up traffic in the outside lane until they are able to accelerate to freeway speeds (entering trucks) or exits the freeway. It also appears that the up-hill grade, one mile downstream, causes some slowing of large trucks and/or prevents them from reaching freeway speeds.
2. The primary P.M. peak period traffic bottleneck on northbound Route 101 in Sonoma county is located in Santa Rosa, between the Baker Avenue and Route 12 interchanges. In addition to this, there appear to be secondary bottlenecks between the Hearn Ave. and Baker Ave. interchanges, and between the Baker Ave. and Todd Rd. interchanges. All three of these bottlenecks operate together as what might be called a "bottleneck complex." In 2000 this bottleneck complex backed-up traffic to the vicinity of the Santa Rosa Avenue interchange. Congestion occurred for at least 4+1/2 hours with maximum vehicle delays of as much as about eight minutes.

There also appear to be more secondary traffic bottlenecks between the College Avenue and Steele Lane interchanges and (probably) between the Third Street and College Avenue interchanges. The impact of these secondary bottlenecks is limited by the primary upstream bottleneck at Rte. 12, but in 2000 they did cause about two hours of traffic congestion and an additional three minutes or so of delay.

3. There also appears to be an incipient bottleneck between the Mendocino Avenue and River Road interchanges. In 2000 traffic briefly slowed down at the Mendocino Avenue on-ramp, then resumed speed.

II. FUTURE TRAFFIC OPERATIONS - YEAR 2029/2030

A. General Characteristics of Traffic Growth

1. Southern Project Area; Old Redwood Highway Interchange to Wilfred Avenue interchange.

Traffic projections prepared by PB show that peak hour traffic is anticipated to increase by about 40% on southbound Route 101 in the 'southern project area,' and by about 49% on northbound Route 101 in the same area, between 2001 and 2030. These projections also show that HOV usage will increase from about 14.5% of total traffic to 19% of total traffic if the proposed HOV lanes are provided.

2. Northern Project Area; Route 12 to North of Windsor River Road.

A review of the traffic projections prepared by the Caltrans Division of Planning indicates that substantial peak hour traffic growth is anticipated on Route 101 north of Route 12 (in Santa Rosa) between 2000 and 2029. On northbound Route 101, peak hour traffic volumes are projected to increase by about 30% to 50% during the A.M. peak hour, and by about 40% to almost 60% during the P.M. peak hour. Traffic growth on southbound Route 101 is even higher, with demand peak hour traffic increasing by about 80% to 100% during the A.M. peak hour and by about 70% to 100 % during the P.M. peak hour. Note that traffic growth on southbound Route 101 is about double the growth on northbound Route 101.

A comparison of year 2029 peak hour traffic for the "No Build" and "Build" alternatives indicates that the proposed HOV lanes will result in an increase in the demand peak hour volumes on both northbound and southbound Route 101. During the A.M. peak hour(s), traffic in both directions of Route 101 will increase by about 9% if the proposed HOV lanes are installed. During the P.M. peak hour(s), northbound traffic will increase by about 5% to 12% if HOV lanes are available. However, southbound traffic will only increase by about 1% if the HOV lanes are built.

B. "No Build" Alternative Traffic Operations; Year 2029/2030

Projected traffic growth will worsen the existing traffic bottlenecks (discussed in Section I above) and may cause additional traffic bottlenecks to develop. In general, the existing roadway system cannot accommodate the projected increases in traffic volumes, and this additional traffic will be added to the existing traffic queues. The

extent and duration of traffic congestion will substantially increase, and vehicle delays will be much longer than those that presently occur will.

C. "Build" Alternative Traffic Operations; Year 2029/2030

The proposed widening projects on Route 101 in Sonoma County will partially mitigate anticipated future traffic congestion, but will not eliminate it. The primary proposal of these widening projects is to provide HOV lanes in both directions on Route 101, to enable high-occupancy vehicles to bypass traffic congestion in the "mixed-flow" lanes. These HOV lanes have two benefits: (a) they enable the roadway to handle more vehicles by supplying new lane-kilometers or lane-miles, and (b) they encourage the use of carpools and busses, with the goal of serving a higher number of people-trips than traditional mixed-flow lanes. Details are as follows:

1. Southbound Route 101 - A.M. Peak Hour

Projected traffic growth on southbound Route 101 will exceed the capacity of the freeway during the A.M. peak period, even with the proposed improvements. Between the Old Redwood Highway and Route 12 interchanges, A. M. peak hour demand traffic volumes in the mixed flow lanes generally range from ten to thirty percent above the lanes' capacities (except for the sections in which three lanes are proposed). Between the Route 12 and Windsor River interchanges, A.M. peak hour demand traffic volumes in the mixed flow lanes generally range from thirty-five to more than one hundred percent above the lanes' capacities (including those sections in which three mixed-flow lanes are projected). If traffic growth occurs as projected, year 2029/2030 traffic congestion will be substantially worse than existing congestion, even if the proposed HOV lanes are in service.

A brief analysis indicates that two primary traffic bottlenecks will develop on southbound Route 101, most likely located downstream of the Pepper Rd. and Todd Rd. on-ramps. The Todd Rd. bottleneck will constrain downstream traffic, so the (constrained) demand peak hour traffic volume at the Pepper Rd. bottleneck will be only about twelve to sixteen percent above the capacity of the mixed flow lanes. The excess peak hour demand will increase the average mixed-flow traffic delay by about five to ten minutes, and will back-up traffic for about six miles (past the Rohnert Park interchange). There will also be additional traffic delays generated by over-capacity traffic demand during other hours of the A.M. peak period.

At the Todd Rd. bottleneck, the demand mixed-flow peak hour traffic volume is about twenty to thirty percent above the capacity of the mixed-flow lanes. This means that, during the peak hour alone, delays to the mixed-flow traffic will increase by about twelve to eighteen minutes (total peak period mixed-flow traffic delays will be significantly greater). Some traffic, notably on-ramp traffic, will experience less delay while freeway traffic will likely experience greater delays. It is anticipated that, if traffic

growth occurs as projected, the southbound mixed-flow lanes will be congested from south of the Todd Rd. on-ramp to some distance north of the Windsor River Rd. interchange. We would also anticipate significant on-ramp backups at Route 12, College Ave., Steele Lane, Bicentennial Way, Hopper Ave., River Rd., Fulton Rd., Airport Blvd., Shiloh Rd., and Windsor River Rd. Heavy on-ramp traffic will have a severe adverse impact on freeway traffic, particularly north of downtown Santa Rosa, and only a fraction of the freeway demand volume would be able to proceed south towards Santa Rosa during the A.M. peak period.

HOV traffic will be able to save a substantial amount of time, particularly north of Route 12. Rough estimates indicate that southbound HOV traffic travelling the length of the two proposed HOV lanes will be able to save about six minutes in the southern project area (Old Redwood Highway to Rohnert Park expressway). In the northern project area (Steele Lane to Windsor River Road), theoretical traffic congestion is so heavy that traffic using the HOV lane could theoretically save thirty minutes or more.

2. Southbound Route 101 - P.M. Peak Hour

Traffic projections were not provided in the southern project area for southbound Route 101 during the P.M. peak hour. Available traffic volumes between the two project areas and for the northern project area indicate that heavy traffic congestion can be expected during the P.M. peak period also, although delays may not be as high as would occur during the A.M. peak period. It is anticipated that the proposed HOV lanes will allow high occupancy vehicles to bypass much of the anticipated mixed-flow lane traffic congestion.

3. Northbound Route 101 - P.M. Peak Hour

Projected P.M. peak hour demand traffic on northbound Route 101 will increase by between 40% and 60% between 2000/2001 and 2029/2030. The proposed roadway improvements will mitigate some of the adverse impacts of this growth, but will not be sufficient to eliminate traffic congestion.

A brief traffic analysis indicates that traffic bottlenecks will develop in two locations. One traffic bottleneck will occur on northbound Route 101 between the Old Redwood Highway interchange in Petaluma and the beginning of the climbing lane on the Petaluma-Cotati Grade. Demand mixed-flow traffic at this location is about sixty-five to seventy-five percent above the capacity of the two mixed-flow lanes. Theoretically, this excess peak hour demand would increase the average mixed-flow traffic delay by about thirty-five to forty-five minutes during the peak hour, and would back-up traffic for several miles. (There would also be additional traffic delays generated by over-capacity traffic demand during other hours of the A.M. peak period.)

The Petaluma bottleneck described above will constrain northbound freeway traffic; in spite of the high demand traffic projections, northbound route 101 would be able to accommodate constrained peak hour traffic in a three lane section, with the auxiliary lanes shown in the traffic report titled; "SON - 101 Widening Project" operational report (June 2001) from this bottleneck to north of Santa Rosa. Although the third northbound lane would be needed in this area, it could be either a mixed-flow lane or an HOV lane; there would be no benefit to northbound HOV traffic until the end of queue caused by another bottleneck (described below) was reached.

The second P.M. peak period traffic bottleneck on northbound Route 101 will occur in the Fulton area north of Santa Rosa. This bottleneck will most-likely develop either between the Fulton Rd. and Airport Blvd. interchanges, or between the Airport Blvd. and Shiloh Rd. interchanges, where demand P.M. peak hour traffic (already partially constrained by the Petaluma bottleneck) would be about eight to twelve percent above the roadway's capacity. This excess peak hour demand would increase the average mixed-flow traffic delay by about five to seven minutes during the peak hour. (As was noted earlier, maximum peak period delays will be higher than the peak hour increase in delay.) Some traffic, notably on-ramp traffic, will experience less or no delay while freeway traffic will experience greater delays. It is estimated that the traffic backup caused by this bottleneck would extend back to the vicinity of Route 12.

A third lane is needed on northbound Route 101 between Old Redwood Highway and Rohnert Park Expressway (the southern project area) to accommodate constrained traffic coming north from Petaluma. Theoretically, there would be no traffic congestion in this project area, if a third lane is provided, so the third lane could be either HOV or mixed-flow. However, since the third northbound lane at the north and south ends of this project will be HOV lanes, the third lane in the southern project area should be an HOV lane to provide continuity.

In the northern project area, HOV traffic would be able to bypass mixed-flow lane traffic congestion extending from the bottleneck in the Fulton area. It is estimated that HOV traffic would save about five minutes in bypassing the mixed-flow lanes congestion (plus additional delay savings outside of the northern project area).

4. Northbound Route 101 - A.M. Peak Hour

Traffic projections were not provided in the southern project area for northbound Route 101 during the A.M. peak hour. Available traffic projections between the two project areas and for the northern project area indicate that demand traffic is lower than the P.M. peak hour volumes but still above the capacity of Route 101. In the absence of P.M. peak hour volumes for the southern project area we are unable to determine the location(s) of bottlenecks. However, it is anticipated that the primary traffic bottleneck will probably be between the Old Redwood Highway interchange in

Petaluma and the beginning of the climbing lane on the Petaluma-Cotati Grade. This bottleneck will constrain traffic on northbound Route 101 north of Petaluma; at this time we cannot determine whether any additional bottlenecks will develop on northbound Route 101 northerly of this bottleneck.

III. PROPOSED AUXILIARY LANES NORTH OF STEELE LANE.

There is a proposal to provide auxiliary lanes on northbound and southbound Route 101 from Steele Lane to Airport Blvd. Our comments regarding this proposal are as follows:

- a) Northbound Route 101: Previous studies for this area assumed that there were auxiliary lanes between the Fifth St. on-ramp and the Bicentennial Way off-ramp. Based on our brief analysis, it is anticipated that the constrained traffic volumes on all freeway sections between the River Rd., Fulton Rd., Airport Blvd. and Shiloh Rd. interchanges would be above the capacities of the two mixed flow lanes. In addition, the constrained traffic volume between the Shiloh Rd. and Windsor River Rd. interchanges would be at or near the capacity of the mixed flow lanes. However, the total constrained traffic volumes would not be above the capacity of three mixed flow lanes. This suggests two alternatives for this part of the northern project:

- (1) Provide three mixed flow lanes (no HOV lane) on northbound Route 101 north of Steele Lane.
- (2) Provide two mixed flow lanes, one HOV lane and auxiliary lanes on northbound Route 101 north of Steele Lane.

Either of these two alternatives would theoretically provide sufficient capacity for constrained P.M. peak hour traffic, if traffic growth occurred as projected.

- b) Southbound Route 101: If traffic growth occurs as projected, it is anticipated that southbound Route 101 will experience heavy traffic congestion north of Steele Lane during the A.M. peak period, and that traffic backups could be expected on several on-ramps in this area. In this situation auxiliary lanes would not have a positive impact on traffic congestion, as the congestion would mainly be determined by conditions at the downstream bottleneck. All these lanes would do would be to benefit traffic on the congested on-ramps and negatively impact the traffic already on the freeway.

IV. SUMMARY

Existing traffic congestion on Route 101 in Sonoma County will substantially worsen in the future, if traffic growth occurs as projected. Traffic projections show that peak hour traffic is anticipated to increase by about forty to fifty percent in 2030, between the Old Redwood Highway (Pengrove) interchange in Petaluma and the Rohnert Park expressway interchange in Rohnert Park, and by between thirty and one hundred percent in 2029 between the Steele Lane interchange in Santa Rosa and the

Windsor River Road interchange in Windsor. Inasmuch as various parts of Sonoma 101 are already operating at capacity, this additional traffic will all be caught in growing traffic queues.

The proposed HOV lane projects, plus other projects under way will result in the establishment of a continuous HOV lane in each direction. They will increase system capacity on Route 101 in Sonoma County, reducing part of the traffic congestion that is expected to develop in the future, and will provide a way for high occupancy vehicles to bypass the rest of the traffic congestion.

This completes our analysis of the traffic impacts of providing HOV lanes; (a) between the Old Redwood Highway (Pengrove) interchange in Petaluma and the Rohnert Park expressway interchange in Rohnert Park, and (b) between the Steele Lane interchange in Santa Rosa and the Windsor River Road interchange in Windsor. If you have any questions concerning this memo, please call either Mike Church at 286-4642 (Calnet 541-4642) or Mike Kerns at 622-5430 (Calnet 542-5430).

Michael Church
Senior Transportation Engineer,
Office of Highway Operations

ATTACHMENT H

ENVIRONMENTAL SCOPING CHECKLIST



Environmental Scoping Checklist

Project Information

District: 4 County: SON Route: 101 Kilometer Post (Post Mile): 12.1 – 22.4 (7.5 – 13.9)
EA: 04-219-0A180K

Description: The project proposes to provide HOV lanes in both directions along Route 101 in Sonoma County between Old Redwood Highway (KP 12.1) in the City of Petaluma and Rohnert Park Expressway (KP 22.4) in the City of Rohnert Park. In addition to the No Build Alternative, there are two build alternatives. The first build alternative, the Minimum Project Alternative, includes the widening of Route 101 from four to six lanes, improvements to existing on-ramps, and construction of a truck-climbing lane in the northbound direction along the Cotati Grade. High Occupancy Vehicle (HOV) lanes would be constructed in both directions along the center median. Ramp improvements include widening all the existing on-ramps to include ramp metering facilities with HOV bypass lanes, along with re-alignment of two on-ramps. The second build alternative, the Expanded Project Alternative, includes all the features of the Minimum Project Alternative, in addition to the construction of auxiliary lanes in both directions between Route 116 West and Rohnert Park Expressway, and three additional ramps at Railroad Avenue (currently only a northbound off-ramp exists at the interchange).

Project Manager Nino Cerruti Phone # (510) 286-5129

Project Engineer Cristina Ferraz Phone # (510) 286-3890

Environmental Functional Manager Susan Simpson Phone # (510) 286-5619

Environmental Scoping

Detailed environmental scoping information is provided in the Environmental section of the PSR(PDS) text.

Anticipated Environmental Approval

CEQA

- ☐ Categorical/Statutory Exemption
- ☐ Negative Declaration
- ☒ Environmental Impact Report

NEPA

- ☐ Categorical Exclusion
- ☐ Finding of No Significant Impact
- ☒ Environmental Impact Statement

Why? Based on the information and environmental issues gathered to date, it is anticipated that the project could result in impacts to the environment. These impacts possibly include degradation of wetland or riparian habitats, change to the visual character of the highway corridor, increased noise for sensitive receptors, loss of parking spaces and vehicle storage areas, and impacts associated with hazardous materials. In order to meet the requirements of NEPA and CEQA for providing full and fair discussions of significant environmental impacts and to inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize the impacts, an Environmental Impact Statement/Report (EIS/R) will be prepared.

Project Screening

Attach the project location map to this checklist to show location of all known and/or potential hazardous waste, cultural (not archaeological) and biological sites identified. (Include any work with drainage and/or waterways).

1. Project Features: New R/W? Yes Excavation? Yes Railroad Involvement? No
Structure demolition/modification? Yes Subsurface utility relocation? Yes
2. Project Setting Route
Rural or Urban Urban and Semi-Rural
Current land uses Highway
Adjacent land uses Commercial, Industrial, Residential, Open Space, Agricultural
(industrial, light industry, commercial, agricultural, residential, etc.)
Existing landscaping/planting Highway landscaping

Cultural Resources Screening

1. Check federal, State, and local environmental records and databases YES as necessary, to see if any known cultural resources site is in or near the project area. If a known site is identified, show its location on the attached map and attach additional sheets, as needed, to provide pertinent information for the proposed project. (Do NOT show location of archaeological sites on the map.)
2. Conduct Field Inspection. Date Not Done
3. Other comments and/or observations: There is the potential that sensitive Native American resources are located within the project area. Further archival and field study is recommended. In accordance with Section 106 of the National Historic Preservation Act of 1966 a Historic Property Survey Report (HPSR), Historic Survey Report (HSR) Archaeological Survey Report (ASR), and Historic Architectural Survey Report (HASR) would be completed.

Hazardous Waste ScreeningIs the project on the HW Study Minimal-Risk Projects List (HW1)? Pending resource information

1. Check federal, State, and local environmental and health regulatory agency records YES as necessary, to see if any known hazardous waste site is in or near the project area. If a known site is identified, show its location on the attached map and attach additional sheets, as needed, to provide pertinent information for the proposed project.
2. Conduct Field Inspection. Date Preliminary site reconnaissance October 15-16, 2001
Use the attached map to locate potential or known HW sites.

STORAGE STRUCTURES / PIPELINES:

Underground tanks Not Seen Surface tanks Not Seen
 Sumps Not Seen Ponds Not Seen
 Drums Not Seen Basins Not Seen
 Transformers Not Seen Landfill Old landfill located in project vicinity, no remnants seen
 Other _____

CONTAMINATION: (spills, leaks, illegal dumping, etc.)

Surface staining Not Seen Oil sheen Not Seen
 Odors Not Seen Vegetation damage Not Seen
 Aerial lead Not Seen Other Not Seen

HAZARDOUS MATERIALS: (asbestos, lead, etc.)

Structures Overpasses Spray-on fireproofing Not Seen
 Pipe wrap/Asbestos Cement Pipe Not Seen Friable tile Not Seen
 Yellow thermoplastic paint Observed Serpentine Not seen, verified by geotechnical engineer
 Lead paint Observed, yellow striping paint Other _____

3. Additional record search, as necessary, of subsequent land uses that could have resulted in a hazardous waste site. Use the attached map to show the location of potential hazardous waste sites.
4. Other comments and/or observations: There is probable aerial lead contamination in the unpaved areas of both the median and outer shoulders. Soil sampling and testing for lead would be necessary prior to construction. Since there may be asbestos containing materials encountered during construction an asbestos survey will need to be conducted to determine if asbestos is present in any material that would be impacted by construction activities. A plan for the management of contaminated soil should be developed with concurrence from NCRWQCB, SFRWQCB, and DTSC.

Determination: Does the project have potential hazardous waste involvement? YES If there is known or potential hazardous waste involvement, is additional ISA work needed before task orders can be prepared for the Preliminary Site Investigation? NO If "YES", then give an estimate of additional time require:

Biological Resources Screening

1. Check federal, State, and local environmental records as necessary YES, to see if any known sensitive biological habitat or wetlands site is in or near the project area. If a known site is identified, show its location on the attached map and attach additional sheets, as needed, to provide pertinent information for the proposed project.
2. Conduct Field Inspection. Date October 15-16, 2001 Use the attached map to locate potential or known endangered species, natural resource or wetland sites.
3. Other comments and/or observations: There are approximately seven areas which may contain ACOE jurisdictional wetlands. An ACOE wetland delineation will need to be conducted in order to determine the impacts to wetlands and riparian habitat throughout the project area. It is likely that an ACOE Section 404 individual or nationwide permit would be required. Based on appropriate database searches there are no known occurrences of any sensitive plant or animal species in the current road alignment but there is known habitat for three sensitive species. Field surveys by a qualified biologist should be conducted during the next phase of the project. A Natural Environmental Study (NES) and Biological Assessment (BA) would need to be prepared for the project.

Environmental Technical Reports or Studies Required Anticipated

	Study/ Report	Document Text Only	Not Anticipated
Community Impact Study	✓	<input type="checkbox"/>	<input type="checkbox"/>
Farmland	<input type="checkbox"/>	<input type="checkbox"/>	✓
Visual Resources	✓	<input type="checkbox"/>	<input type="checkbox"/>
Water Quality	✓	<input type="checkbox"/>	<input type="checkbox"/>
Floodplain Evaluation	✓	<input type="checkbox"/>	<input type="checkbox"/>
Noise Study	✓	<input type="checkbox"/>	<input type="checkbox"/>
Air Quality Study	✓	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cultural			
ASR	✓	<input type="checkbox"/>	<input type="checkbox"/>
HSR	✓	<input type="checkbox"/>	<input type="checkbox"/>
HASR	✓	<input type="checkbox"/>	<input type="checkbox"/>
HPSR	✓	<input type="checkbox"/>	<input type="checkbox"/>
Section 106 / SHPO	✓	<input type="checkbox"/>	<input type="checkbox"/>
Section 4(f) Evaluation	<input type="checkbox"/>	✓	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Study/ Report	Document Text Only	Not Anticipated
Hazardous Waste			
ISA (Additional)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PSI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

No. Of

Biological			
Endangered Species (Federal)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Endangered Species (State)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Biological Opinion / USFWS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wetlands	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
401 Permit Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
404 Permit Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1601 Permit Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NPDES Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Natural Environment Study	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biological Assessment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NEPA 404 Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Anticipated Project Mitigation

Discuss any known likely mitigation requirements and coordination based on similar projects and experience with resource agencies within the project vicinity: Mitigation would be required for all potential impacts to the various environmental resources located within the project area. Mitigation may include highway landscaping and tree replacement, construction of sound walls, erosion control, storm water pollution control, on or off-site wetland restoration, and development of disposal procedures for hazardous materials. Mitigation for impacts to cultural resources would be developed in consultation with proper Native American organizations, FHWA, State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation. The estimated mitigation costs listed below only include those costs associated with hazardous waste and wetland mitigation. Costs for other measures are included in Section 4, Specialty Items, of the cost estimates provided in Attachment D.


Estimate of Project Mitigation Costs Are:

Minimum Project Alternative: _____ \$2,984,100
 Expanded Project Alternative: _____ \$3,133,146

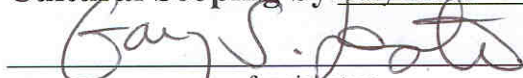
Hazardous Waste Scoping by Paul Jones **Date** December 12, 2001


for signature

Biological Scoping by Gary Lester and Misha Schwarz **Date** December 12, 2001


for signature

Cultural Scoping by Gary Lester **Date** December 12, 2001


for signature

Reviewed by Susan A. Simpson **Date** December 18, 2001

Susan Simpson

ATTACHMENT I

RIGHT OF WAY DATA SHEET

TO: John Komau
 Attention: Rachael Donovan

From: FRANK C. SCHOBER
 Right of Way Resource Manager

Date 12-3-01
 Dist 4 Co. Sen Rte 101 KP 12.1/22.9
 E.A. OA/80K
 Project Description Route 101 Widening
Project from Old Redwood Hwy to
Rohnert Park Expressway

Subject: Current Estimated Right of Way Costs

We have completed an estimate of the right of way costs for the above referenced project based on maps we received from you on _____, and the following assumptions and limiting conditions.

- [] 1. The mapping did not provide sufficient detail to determine the limits of the right of way required.
- [] 2. The transportation facilities have not been sufficiently designed so our estimator could determine the damages to any of the remainder parcels affected by the project.
- [] 3. Additional right of way requirements are anticipated, but are not defined due to the preliminary nature of the early design requirements.
- [] 4. This estimate does not include \$ _____ right of way costs previously incurred on the project, which may affect the total project right of way costs for programming purposes.
- [] 5. We have determined there are no right of way functional involvement in the proposed project at this time, as designed.

Right of Way Lead Time will require a minimum of 28 months after we begin receiving final right of way requirements (PYPSCAN node No. 224), necessary environmental clearance has been obtained, and freeway agreements have been approved. From the date of receipt of final right of way requirements (PYPSCAN node No. 265), we will require a minimum of 20 months prior to the date of certification of the project. Shorter lead times will require either more right of way resources or an increased number of condemnation suits to be filed. Either of these actions may reflect adversely on the District's other programs or our public image generally.


 Right of Way Resource Manager

Attachments:

- [] Right of Way Data Sheet – Page One (always required)
- ☒ [] Right of Way Data Sheet – All Pages (required when interest in real property is being acquired)
- ☒ [] Utility Information Sheet
- [] Railroad Information Sheet

RIGHT OF WAY DATA SHEET

TO: Advance Planning

Date 11/28/01 #4457

Dist 04 Co Son Rte 101 KP 12.1/22.9

ATTN: Christina Feraz

EA 0A180K

Project Description: Road widening and
Improvement.

SUBJECT: Right of Way Data – Alternate No. Maximum Alternative

1. Right of Way Cost Estimate:

	Current Value (Future Use)	Escalation Rate	Escalated Value
A. Acquisition, including Excess Lands and Damages	\$ <u>4,574,000.00</u>	%	\$ <u>4,574,000.00</u> ✓
B. Loss of Goodwill	\$ <u>185,000.00</u>	%	\$ <u>185,000.00</u> ✓
C. Utility Relocation (State Share)	\$ <u>131,000.00</u>	%	\$ <u>131,000.00</u>
D. Relocation Assistance	\$ <u>358,000.00</u>	%	\$ <u>358,000.00</u>
E. Clearance/Demolition	\$ <u>149,000.00</u>	%	\$ <u>149,000.00</u>
F. Title and Escrow Fees	\$ <u>32,000.00</u>	%	\$ <u>32,000.00</u>
G. Current Value (Future Use)	\$ <u>00.00</u>	%	\$ <u>00.00</u>
H. <u>TOTAL ESCALATED VALUE</u>			\$ <u>5,429,000.00</u>
I. Construction Contract Work	\$ <u>00.00</u>		

2. Anticipated Date of Right of Way Certification _____

3. Parcel Data:

Type	Dual/Appr	Utilities	RR Involvements	
X <u>1</u>		U4-1 <u>3</u>	None	X
A		-2	C&M Agrmt	
B <u>22</u>		-3 <u>5</u>	Svc Contract	
C <u>1</u>		-4	Lic/RE/Clauses	
D		U5-7		
E <u>XXXX</u>		-8 <u>1</u>	Misc R/W Work	
F <u>XXXX</u>		-9 <u>6</u>	RAP Displ	<u>13.00</u>
			Clear Demo	<u>3.00</u>
			Const. Permits	<u>0.00</u>
			Condemnation	<u>5.00</u>
Total <u>24</u>				

Areas: Right of Way _____ No. Excess Parcels _____ Excess _____

Enter PMCS Screens 12 / 3 / 01 by gsm

Enter AGRE Screen (Railroad data only) _____ / _____ / _____ by _____

4. Are there any major items of construction contract work?
Yes ☐ No ☒ (If yes, explain)

5. Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).

There are 24 parcels required for this project. There are three full takes, two commercial with improvements and one residential property with a SFR and a Duplex. The 21 other parcels are part takes with no improvements affected.

6. Is there an effect on assessed valuation?
Yes ☐ Not Significant ☒ No ☐ (If yes, explain)

7. Are utility facilities or rights of way affected? Yes ☒ No ☐
(If yes, attach Utility Information Sheet Exhibit 01-01-05)

Utility verification required.

8. Are railroad facilities or rights of way affected? Yes ☐ No ☒
(If yes, attach Railroad Information Sheet Exhibit 01-01-06)

9. Were any previously unidentified sites with hazardous waste and/or material found?
Yes ☐ None evident ☒ (If yes, attach memorandum per Procedural Handbook Volume 1, Section 101.011)

10. Are RAP displacements required? Yes ☒ No ☐
(If yes, provide the following information)

No. of single family	<u>1</u>	No. of business/non profit	<u>10</u>
No. of multi-family	<u>2</u>	No. of farms	<u> </u>

Based on Draft/Final Relocation Impact Statement/Study dated , it is Anticipated that sufficient replacement housing (will/will not) be available without Last Resort Housing.

11. Are there material borrow and/or disposal sites required? Yes ☐ No ☒
(If yes, explain)

12. Are there potential relinquishments and/or abandonments? Yes ☐ No ☒
(If yes, explain)

13. Are there any existing and/or potential Airspace sites? Yes ☐ No ☒
(If yes, explain)

14. Indicate the anticipated Right of Way schedule and lead time requirements. (Discuss if District proposes less than PMCS lead time and/or if significant pressures for project advancement are anticipated.)

PYPSCAN lead time (from Regular R/W to project certification) 28 months

15. Is it anticipated that all Right of Way work be performed by CALTRANS staff?
Yes ☒ No ☐ (If no, discuss)

Assumptions and Limiting Conditions

1. The right of way requirements estimated were determined maps and information supplied by Project Design (John Komaru dated October 2001) and valued based on data available on the date of request.
2. This report was completed without the benefit of a hazardous waste permit.

Evaluation Prepared By:

LYNN WHITE

Right of Way:

Name



Date

11/28/01

Railroad:

Name



Date

11/28/01

Utilities:

Name



Date

11/16/01

Recommended for Approval:



Right of Way Capital Cost Coordinator

I have personally reviewed this Right of Way Data Sheet and all supporting information. It is my opinion that the probable Highest and Best Use, estimated values, escalation rates, and assumptions are reasonable and proper subject to the limiting conditions set forth, and find this Data Sheet complete and current.


Chief, R/W Appraisal Services

Date

11/4/01

cc: Program Manager
Project Manager

UTILITY INFORMATION SHEET

1. Names of Utility Owners to be sent :

A. VERIFICATION REQUESTS:

PG&E(2)	AT&T
Sonoma County Water	City of Rohnert Park
Pac Bell	City of Petaluma

B. POSITIVE LOCATION REQUESTS:

PG&E
Sonoma County Water Dept.

C. RELOCATION REQUESTS:

PG&E(gas & electric)	AT&T Cable
Pac Bell	Sonoma County Water Dept.

2. TYPES OF FACILITIES:

A. VERIFICATIONS Gas, Electric, Telephone, TV Cable, Water, Sewer (if needed)

B. POSITIVE LOCATIONS: Gas & Water

C. RELOCATIONS: Gas, electric, water & phone lines

3. Additional information concerning utility involvements on this project:

(X verification letters will be sent.) or (verifications will not be required)

4. PMCS input information

		Utility Involvements
U4-1	<u>3</u>	Owner Expense Involvements
U4-2	<u> </u>	State Expense Involvements (conventional, no Fed)
U4-3	<u>5</u>	State Expense Involvements (freeway, no Fed)
U4-4	<u> </u>	State Expense Involvements (Fed Aid)
U5-7	<u>1</u>	Verifications not resulting in involvements
U5-9	<u>6</u>	Verifications resulting in involvements

ESTIMATED STATE SHARE OF COSTS \$

Prepared by: Noel Santillan

Noel Santillan
Right of Way Utility Coordinator

11/16/01
Date

RIGHT OF WAY DATA SHEET

TO: Advance Planning Date 11/28/01 #4457

Dist 04 Co Son Rte 101 KP 12.1/22.9

ATTN: Christina Feraz EA 0A180K

Project Description: Road widening and Improvement.

SUBJECT: Right of Way Data – Alternate No. Minimum Alternative

1. Right of Way Cost Estimate:

	Current Value (Future Use)	Escalation Rate	Escalated Value
A. Acquisition, including Excess Lands and Damages	\$ <u>4,375,000.00</u>	%	\$ <u>4,375,000.00</u>
B. Loss of Goodwill	\$ <u>185,000.00</u>	%	\$ <u>185,000.00</u>
C. Utility Relocation (State Share)	\$ <u>131,000.00</u>	%	\$ <u>131,000.00</u>
D. Relocation Assistance	\$ <u>358,000.00</u>	%	\$ <u>358,000.00</u>
E. Clearance/Demolition	\$ <u>149,000.00</u>	%	\$ <u>149,000.00</u>
F. Title and Escrow Fees	\$ <u>31,000.00</u>	%	\$ <u>31,000.00</u>
G. Current Value (Future Use)	\$ <u>00.00</u>	%	\$ <u>00.00</u>
H. <u>TOTAL ESCALATED VALUE</u>			\$ <u>5,229,000.00</u>
I. Construction Contract Work	\$ <u>00.00</u>		

2. Anticipated Date of Right of Way Certification _____

3. Parcel Data:

Type	Dual/Appr	Utilities	RR Involvements	
X <u>1</u>		U4-1 <u>3</u>	None	X
A _____		-2 _____	C&M Agrmt	
B <u>21</u>		-3 <u>5</u>	Svc Contract	
C <u>1</u>		-4 _____	Lic/RE/Clauses	
D _____		U5-7 _____		
E <u>XXXX</u>		-8 <u>1</u>	Misc R/W Work	
F <u>XXXX</u>		-9 <u>6</u>	RAP Displ	<u>13.00</u>
			Clear Demo	<u>3.00</u>
			Const. Permits	<u>0.00</u>
			Condemnation	<u>0.00</u>
Total <u>23</u>				

Areas: Right of Way _____ No. Excess Parcels _____ Excess _____

Enter PMCS Screens _____ / _____ / _____ by _____

Enter AGRE Screen (Railroad data only) _____ / _____ / _____ by _____